REVIEW AND APPROVALS

BENTON LAKE NATIONAL WILDLIFE REFUGE

Great Falls, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1998

James E McCollum 1/24/00
Project Leader Date

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Refuge Supervisor Date

Ron Shupe 1-13-00
Regional Office Approval Date

INTRODUCTION

Benton Lake is a 12,383 acre refuge located on the western edge of the northern Great Plains some 50 miles east of the Rocky Mountains and 12 miles north of Great Falls, Montana. Benton Lake proper is a 5,000 acre closed basin marsh, terminus of a 145 square mile watershed. Refuge terrain is gently rolling with short-grass native prairie being the predominant vegetative type. Four mountain ranges are readily visible from the refuge; the Highwood Mountains to the east, the Little Belt Mountains to the southeast, the Big Belt Mountains to the south and the Rockies to the west.

The climate is generally temperate with wide fluctuations in temperature and precipitation. Summer highs may soar over 100 degrees F while winter lows may drop to -50. Rain and snow are erratic with an average annual precipitation of about 15 inches. Extremely windy conditions occur in the fall through spring, due to frequent Chinook winds which are generated along the Rocky Mountain front.

The lake basin has been diked into eight marsh units to provide better water control for the enhancement of submergent and emergent vegetation and to limit botulism outbreaks. Water management is generally by gravity flow, although an inter-unit pumping system allows for water management flexibility, especially in the event of a botulism outbreak.

This prairie wetland supports a diversity of wetland habitats for 42 breeding species and 69 nonbreeding species in migration. Breeding waterfowl are dominated by Canada geese, gadwall, northern pintail, northern shoveler, blue/cinnamon teal and mallard. Other nesters include black terns, white-faced ibis, 10-13,000 pairs of Franklin's gulls and nine species of shorebirds , including black-necked stilts, The refuge is an important migration stop during spring and fall with up to 100,000 ducks, 100,000 snow and Ross's geese, 50,000 shorebirds, 20,000 Canada geese and 5,000 tundra swans present. Bald eagles and peregrines are often seen in spring and fall.

Other refuge wildlife include twenty species of mammals including; white-tailed jackrabbit, cottontail rabbit, Richardson's ground squirrel, muskrat, badger, stripped skunk, mink, long-tailed and least weasel, raccoon, coyote, white-tailed deer, and a limited number mule deer and pronghorn antelope. Only a handful of reptile and amphibian species are present. No sizeable fish occur due to the shallowness of the marshes.

Land use around the refuge is predominately cropland with wheat being the principal crop grown. The area from Great Falls north to the Canadian border is known as the "Golden Triangle" of Montana due to the monoculture of small grains. The fallow-crop system employed over much of the area causes problems with refuge water quality by accelerating salinity and trace element accumulation in springs and seeps. Changing private land use practices in the watershed to benefit refuge water quality is a major challenge of the years ahead.

The refuge public use program attracts 10,000 visitors each year. The nine mile auto tour route attracts the majority while up to 1,500 hunters use the 3,500 acre public hunting area for waterfowl and upland bird hunting each fall. Over 2,000 school students participate annually in school organized environmental education on the refuge.

The Benton Lake Wetland Management District and the Montana Partners for Wildlife program are also administered from the refuge. Details of those programs are found in the District narrative following the refuge section.

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BENTON LAKE NATIONAL WILDLIFE REFUGE

Great Falls, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1998

A. HIGHLIGHTS

Although official precipitation was above normal, a warm dry winter and minimal run-off to refuge wetlands result in the costliest pumping season ever. See B., page 2 and F.2., page 12.

Eleven volunteers contribute 1327 hours of work to refuge activities. See E.4., page 8.

The refuge prescribed burning program reached a new benchmark of 876 acres. See F. 9., page 15.

The refuge reached agreement with a neighboring farmer regarding irrigation and periods of diversion on Muddy Creek which protect refuge water rights on the creek. See F.11., page 18.

Two Sabine's gulls make a rare visit to the refuge. See G.5., page 25.

B. CLIMATIC CONDITIONS

The nearest National Weather Service station is at Great Falls, 15 miles south of the refuge. Unofficial weather is recorded at the refuge office using Weather Service instruments.

The first day of the new year was exceptionally warm with afternoon high of 56 degrees, but, by the next day the refuge temperature was -26. Most of the winter's cold weather occurred in the following two weeks with the refuge low dropping to -33 on January 12. Temperatures for the remainder of the winter were much above normal. Although mid-winter precipitation was about average there was no accumulation of snow due to repeated warm spells. The result was no snowmelt runoff into the refuge when spring arrived. March and April continued the dry, warm, below normal wind regime established in February. Moisture conditions improved substantially in May, June and July with above normal precipitation and near normal temperatures. August and September were warmer than normal and began an drying trend which continued thru the end of the year. The hottest day of the summer occurred on August 6th at 99 degrees. Temperatures for the remainder of the year were near normal. There was only one late year severe cold snap with below zero temperatures. It occurred during the week before Christmas when a low of -26 was tallied. Although several snowfalls occurred in November and December, repeated chinook winds quick erased the white stuff so that at year's end there was only a trace accumulation of snow to carry into the new year.

TABLE I

WEATHER DATA - 1998

	GREAT FALLS					REFUGE
	Temperature (F)		Precipitation			Precipitation
	High	Low	Total	Depart	Snow	Total
January	57	-30	0.76	-0.15	11.0	0.83
February	56	5	0.42	-0.15	3.4	0.12
March	60	-6	1.10	+0.04	14.7	0.99
April	80	24	0.45	-0.96	0.9	0.30
May	85	30	3.12	+0.60	T	1.04
June	76	32	5.16	+2.77	0.3	3.74
July	96	47	1.40	+0.16	0.0	1.80
August	99	41	1.52	-0.02	0.0	1.53
September	95	34	0.88	-0.36	0.0	1.15
October	77	18	0.65	-0.13	1.0	0.54
November	64	7	0.96	+0.30	13.0	1.30
December	57	-26	0.22	-0.63	5.0	0.28
Max/Min Temps	99	-30				
Precip Total/Departure from Avg.			16.64	+1.47	49.3	13.62

D. PLANNING

5. Research and Investigations

a. Benton Lake NWR Non-game Monitoring Program. Progress Report. Meghan J. Piercy

Point count censuses were conducted in the short-grass prairie at Benton Lake National Wildlife Refuge each year for five years between 1994 - 1998. Point counts were also conducted for four years (1995 - 1998) at Furnell and Kingsbury Lake WPA's. Historically, much of the avian research effort in the prairie pothole region has been focused on waterfowl. The purpose of this work is to monitor non-game grassland birds and to incorporate relevant data when defining habitat objectives. In addition, this monitoring program contributes to the Montana Natural Heritage Program's Bird Distribution Publication. See Wetland Management District 1998 report D.5 for more information.

While cumulative species richness has been steadily increasing in the prairie, total number of individuals and mean number of individuals per point count station have been steadily declining for (at least) the past five years). In 1994 chestnut-collared longspur accounted for 55% of all detections at Benton Lake whereas in 1998, they accounted for 30% of all detections. Relative abundance decreased from 4.9 birds per point in 1994 to 1.9 birds per point in 1998.

In all five years of the point counts, chestnut-collared longspur have been more abundant in the prairie than savannah sparrows, but the margin between their numbers has been shrinking. In 1994 there were 118 more chestnut-collared longspurs than savannah sparrows and in 1998 there were only 6 more chestnut-collared longspurs than savannah sparrows.

TABLE II

Chestnut-Collared Longspur detections at Benton Lake NWR During Point Counts

Year	Date of Second Census	CCLO<100m	Total # of CCLO	Species Relative Abundance <100 m
1994	6/17 - 6/22	236	354	4.9
1995	6/12 - 6/13	161	195	3.4
1996	6/20 - 6/21	135	165	2.8
1997	6/17 - 6/19	117	141	2.4
1998	6/15 - 6/19	91	128	1.9

b. **Interactions of hormones and behavior in chestnut-collared longspurs (*Calcarius ornatus*) breeding at Benton Lake National Wildlife Refuge: Report of activities, April-July 1998. Sharon Lynn, U of Washington, Dept. Zoology, April 1999.**

Highlights from this report included the following life history and breeding biology information for chestnut-collared longspur at Benton Lake:

"We captured a total of 42 adult chestnut collared longspurs between April and July of 1998. Each bird captured was given a unique combination of colored plastic leg bands to aid in identification of individuals at a distance, as well as a U.S. Fish and Wildlife Service aluminum leg band. We also banded 59 nestlings with USFWS aluminum leg bands.

"The first egg of the earliest known nest was laid May 4, 1998. Birds continued to initiate nests through late June. During the course of the breeding season, we located 34 nests and followed each such that the outcome (successful fledging or nest failure) could be determined. Young were successfully fledged from 19 of the 34 nests (a 56% success rate). Of the 15 nests that failed, five were apparently abandoned at some stage of incubation. Adults from at least two of these nests had successful re-nests following abandonment. In the other three, it is unknown whether or not the nests were abandoned in favor of a re-nesting attempt due to unsatisfactory nesting conditions, or disturbance, or whether the adults themselves were killed. Ten nests were depredated, six during the nestling stage, four during incubation.

"Of the nests that we monitored, the latest fledging date was July 19, 1998. For all nests, fledglings were fed on territories by both parents. After fledglings reached independence, we were unable to track juvenile movements. After completion of the second clutch, adults did not remain on their breeding territories."

c. **Biodiversity Inventory and Representativeness of Research Natural Areas on National Wildlife Refuges in Montana. Designated areas within Benton Lake, C. M. Russell , Lake Mason, Medicine Lake and Red Rock Lakes National Wildlife Refuges. Unpublished Report (Draft). Steve V. Cooper and B. L. Heidel. Montana Natural Heritage Program, Helena, Mt. Task Order Number 61510-7 M012. March 1999. (An Ecosystem Team funded project).**

There are 15 Research Natural Areas (RNAs) on National Wildlife Refuges in Montana. The purpose of this study was to develop a baseline of ecological and botanical information on each of these RNAs. Each was inventoried for significant ecological and botanical attributes: outstanding plant association examples, rare plant associations, and Montana plant species of special concern. Biodiversity and representativeness information was prepared for each study site, including a profile of all well-developed and uncommon native plant associations, description of any rare plant species populations, and a summary of biodiversity significance that incorporates this new data with original RNA designation records. The study results provide a reference for refuge managers and researchers, a

standard for comparing throughout the Refuge system in the Region, and a contribution to the systematic evaluation of natural areas across the Montana landscape as a whole.

E. ADMINISTRATION

1. Personnel

There were several staff changes at the station this year including two promotions of refuge staff. Office Assistant **Jackie Rea** was promoted to full performance level GS-7 effective March 1. Assistant Refuge Manager **Steve Martin** was promoted to GS-12 effective May 18.

Meghan Piercy worked again as a seasonal biological technician beginning April 26 and was joined on June 3 by **Todd Stefanic**, also a seasonal bio tech. On August 3, **Susan Spurgeon** was hired on an emergency special need appointment for two consecutive thirty day appointments to fill in as office assistant while Jackie Rea was on extended sick leave. In September, Todd accepted a permanent appointment as a biological technician at Arapaho NWR at Walden, CO. In anticipation of his departure and to get an accumulation of late season work projects completed, **Robert Jordan** was hired on a 90 day temporary intermittent appointment in late August. Biological Technician **Joseph Wiegand**, the Partners for Wildlife specialist for Northeast Montana, resigned August 15. **Dean Vaughan** has been working for the Partners For Wildlife Program for since 1991. He moved from the National Bison Range rolls to the Benton Lake Complex roster on July 5 upon the re-description of his position from biological technician to wildlife biologist. Dean continues to work out of the NBR office.

Office assistant Jackie Rea resigned unexpectedly in mid-October. Her departure left the refuge staff scrambling to accomplish their normal duties while also getting that all important paper work done to keep the office functioning. This opening gave the refuge an opportunity to redescribe the position for an Administrative Officer to acknowledge the station's growing administrative complexity. This change was approved in December but the position remained vacant at year's end.

Table III displays the staffing level at the Benton Lake office since 1993 while Table IV shows the staff assigned to the Complex in 1998.

TABLE III

STAFFING LEVELS AT BENTON LAKE NATIONAL WILDLIFE REFUGE,
BENTON LAKE WETLAND MANAGEMENT DISTRICT,
MONTANA HABITAT ACQUISITION OFFICE AND
MONTANA PARTNERS FOR WILDLIFE, 1993-1998

Fiscal Year	Permanent	Term, Temporary Or Seasonal	YCC	Total FTE's
1998	10	6	3	13.5
1997	9	3	3	12.4
1996	8	5	3	11.5
1995	8	5	3	12.13
1994	9	4	2	12.2
1993	9	4	2	10.7

G. Neudecker, S. Martin, G. Sullivan, B. Johnson, G. Brewer, J. McCollum, J. Stutzman
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Back: S. Sturgis, J. Garcia, M. Piercy, S. Spurgeon, J. Higgins, J. Barlow
Front: R. Anderson, T. Stefanic, M. Meade
MLM 8/98

TABLE IV

PERSONNEL ASSIGNED TO BENTON LAKE NATIONAL WILDLIFE REFUGE, BENTON LAKE WETLAND MANAGEMENT DISTRICT MONTANA HABITAT ACQUISITION OFFICE MONTANA PARTNERS FOR WILDLIFE

1998 Permanent Staff

Name	Position	Grade	EOD	Depart
Gale F. Brewer	Eng Equipment Operator,	WG-10	10/03/92	
Randall Gazda	Biological Technician, PFW	GS-06	10/04/94	
Robert F. Johnson	Wetland District Manager	GS-11	04/21/91	
Stephen J. Martin	Asst Project Leader	GS-12	01/29/89	
James E. McCollum	Project Leader	GS-13	06/12/91	
Susan McNeal	Wildlife Biologist, PFW	GS-09	08/31/97	
Gregory A. Neudecker	Asst MT Coordinator, PFW	GS-11	04/07/90	
Jacqueline Rea	Admin Assistant	GS-07	06/25/95	10/26/98
James Stutzman	MT Coordinator, PFW	GS-13	01/12/92	
Gary L. Sullivan	Realty Specialist	GS-12	02/01/87	
Dean Vaughan*	Wildlife Biologist, PFW	GS-09	11/07/91	

Term & Temporary Staff

Robert Jordan (Tmp)	BioTech(Wildlife)	GS-05	08/24/98	11/21/98
Melinda Meade (Trm)	BioTech. (Wildlife)	GS-06	05/15/95	
Meghan Piercy (Tmp)	BioTech. (Wildlife)	GS-05	04/26/98	11/08/98
Susan Spurgeon (Tmp)	Clerk-Typist	GS-03	08/03/98	10/01/98
Todd Stefanic (Tmp)	BioTech (Wildlife)	GS-05	06/01/98	09/26/98
Joseph Wiegand**(Trm)	BioTech (Private Lands)	GS-05	09/28/97	08/15/98
Ryan Anderson	YCC		06/22/98	08/14/98
John Barlow	YCC		06/22/98	08/14/98
Jeanni Higgins	YCC		06/25/98	08/14/98

*stationed at the National Bison Range, Moise, MT.
**stationed at Medicine Lake NWR, Medicine Lake, MT.

2. Youth Programs

Ryan Anderson, Jeanni Higgins, and returnee John Barlow participated in the refuge YCC program. This year major accomplishments centered around maintenance work, particularly building maintenance. Heavy emphasis was placed on mapping refuge features (i.e. signs, buildings, bridges, roads) with a Global Positioning System. By summers end, each member of the YCC crew was familiar with the GPS process from start to finish. Time was also set aside to assist with wildlife surveys. The crew was a valuable resource for accomplishing projects that the regular staff did not have time to complete.

Volunteer Andy Ferris contributed many hours to the predator trapping program and with nest dragging surveys. Andy is a student at Hocking College in Ohio.

3/98

4. Volunteer Programs

Eleven individuals contributed 1,327 hours of volunteer time to the refuge in 1998. Sean Sturges, a student from Carlton College, MN. contributed 320 hrs to the Benton Lake NWR Environmental Education Program this summer. Sean worked on a project to develop Environmental Education for students of the Montana School for the Deaf and Blind (MSDB), Great Falls, MT. Sean's project entitled "Sights, Sounds and Smells of a Prairie Marsh", focused on the refuge's 1,000 foot accessible boardwalk and how to interpret the walk for blind students. His contacts and oral presentation to the Staff of MSDB resulted in the first time visit of eight 11to 17 year old students from MSDB to Benton Lake NWR. The blind students were provided with an opportunity to encounter wildlife and their habitats that previously was unknown to them. Sean was unable to attend the tour, since he returned to college, but the refuge staff relayed to him the joy experienced by the MSDB students as well as the staff's joy in teaching and sharing the unforgettable experience.

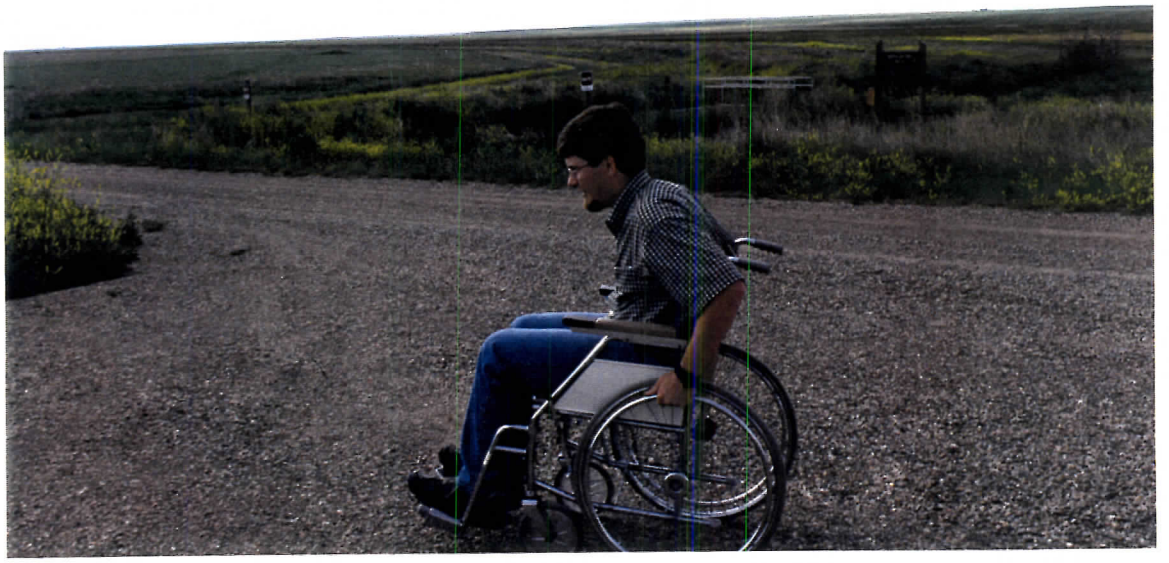
Andy Ferris from Hocking College, Ohio, volunteered 472 hrs from April-June, to the refuge biological program. Andy's primary duty was monitoring California gull nesting to determine the location of colonies and the number of nests. Andy also assisted with bird surveys and nesting studies of waterfowl and shorebirds.

Janie Garcia also from Hocking College volunteered 392 hrs from July-September. Janie's duties included bird surveys, botulism surveys, computer data entry, maintenance, and duck banding. Eight other volunteers contributed 143 hours to the biological and public use programs throughout the year.

5. Funding

A new primary funding subactivity for Realty/Land Acquisition activities was appended to the Complex funding sources this year to support the developing Montana Habitat Acquisition Office. This is an addition to the three existing primary activities at the Station, the Refuge, the Wetland Management District and the Montana Partners for Wildlife Program.

Funding in 1998 was sufficient for conducting most continuing operations. However, the backlog of needed maintenance and operations activities on the refuge and WMD continued to build. Funding was not sufficient to fill a maintenance worker position vacant since 1995 or to contract the work that position accomplished in the past. This is resulting in a continuing decline in condition of a number of refuge facilities. The WMD operational backlog is less noticeable but more insidious. With funding for only one position for the District, a wide range of management actions are not being adequately accomplished.



Volunteer Sean Sturges wanted to experience the boardwalk from a different perspective so he borrowed a family member's wheelchair. His hands-on experience enabled him to make recommendations for future boardwalk changes.

MJP 6/98

Tables V and VI display funding history and subactivity funds distribution for 1998.

TABLE V

ANNUAL FUNDS TARGETED TO BENTON LAKE REFUGE COMPLEX
1994 - 1998

Subactivity	1998	1997	1996	1995	1994
Refuge/WMD	493,125	516,983	460,095	536,994	674,775*
PFW	770,800	760,000	580,000	738,900	626,250
Realty	10,000				
Totals	$1,273,925	$1,276,983	$1,040,095	$1,275,894	$1,301,025

* - included $69,000 in funds controlled by Regional Office and expended by other stations.

TABLE VI

FUNDS AVAILABLE BY SUBACTIVITY
IN FISCAL YEAR 1998

Subactivity-Project		Fund Target
1121-0000	PFW Private Lands Base (PFW)*	551,000
1231-60MB	Migratory Birds-Duck Banding (Ref)*	3,500
1231-60MB	Migratory Birds-Hunter Education (Ref)	4,000
1234-0000	Migratory Birds-Habitat (PFW)	70,000
1261-0000	Refuge Operations-Base (Ref)	372,500
1261-60YC	Youth Conservation Corps (Ref)	4,425
1261-6003	Volunteers (Ref)	400
1261-60XX	Challenge Grants (Ref)	8,000
1261-60XX	Challenge Grants (PFW)	24,800
1261-6UMY	Ecosystem Mgt (Ref)	45,500
1262-0000	Refuge MMS Projects (Ref)	40,500
1332-0000	Fisheries Habitat (PFW)	15,000
2957-0000	Flood Damage Repair (Ref)	5,000
3110-0000	Realty/Acquisition (Rty)*	10,000
3720-0000	North Am Wetlands (PFW)	110,000
7208-0000	Challenge Grant-Habitat Restoration (PFW)	30,000**
8610-0000	Quarters Maintenance (Ref)	7,000
9251-0000	Fire Preparedness (Ref)	2,300
	TOTALS	1,303,925

* PFW = Partners for Wildlife Program; Ref = Refuge Program; Rty = Realty Program.
** Fund targeted to C.M. Russell NWR, obligated by MT PFW program.

Life on the refuge does have its "perks". Beautiful sunsets produce a wide array of colors that can vary from minute to minute resulting in the appearance of a constantly changing landscape.

MLM **8/98**

F. HABITAT MANAGEMENT

1. General

Future management of refuge habitats will be substantially influenced by the NWR System Improvement Act of 1997, the FWS Ecosystem Approach to Management, Comprehensive Conservation Planning and assessment of refuge compatibility issues. Future management also requires a better understanding of refuge wildlife and their associated habitats. (See G.1 for wildlife efforts). Utilizing existing knowledge and expanding our information base will be essential in developing good goals and measurable objectives for habitat management. The refuge has never been adequately cover mapped. The development of measurable habitat objectives are contingent on the identification of habitat subtypes and mapping of refuge vegetation.

2. Wetlands

Poor prairie snow pack and the lack of spring rains resulted in only 750 acre feet (AF) of runoff to the refuge. Runoff is based on measurements at the USGS gaging station on Lake Creek and staff gage readings for other tributaries. Past years estimates for total runoff are as follows:

1997	1996	1995	1994	1993
2,245 AF	846 AF	399 AF	227 AF	3,049 AF

Annual runoff from 1970 - 1998 averages 3,022 AF per year.

Pumping supplemental water from Muddy Creek began on April 20th and continued until June 16th. Pumping resumed on August 24th and continued until November 11th. On August 25th an apparent lighting strike on the electrical transformer adjacent to the pump house resulted in the shut down of pumping for eight days while the Montana Power Company repaired the damaged unit. Estimates of pumped water are based on theoretical acre feet output per hour for the three Muddy Creek pumps. Estimated pumped volumes totaled 6684 AF, at a cost of $61,885.32 (electricity) or $9.26/AF.

At year's end the refuge marshes contained 761 AF more water than in January. Refuge water totaled 4495 surface acres(SA)(3743 AF) in December compared to 4078 SA (2982 AF) in January. The following unit by unit synopsis contains a brief description of water management and wildlife use for the eight marshes. Species of Special Concern are underlined (See G.1)

Unit I supported 500 common goldeneyes and 3,000 tundra swans *in mid-March* and provided high quality spring nesting habitat for species such as ruddy duck, eared grebe, black-crowned night-heron, sora rail, marsh wren, and common yellowthroat. Black and Forster's tern nesting was suspected although no nests were found. Peregrine falcon's were sighted during April and May.

Plans this year included rehabilitation of the water control structures and north spillway vehicle crossings in Units I & II. See I.2 for details. To accommodate the work a complete draw down was planned to dry up the work site at each structure by July 1st for the expected two week project. Draw downs began in April and by June 300 AF had been transferred to Unit II and other marshes. At this time the staff learned that all the bids for the contract exceeded the allocated funds and the project was postponed. This change in plans resulted in higher water levels late in the summer than those projected in the annual water management plan.

Spillway construction in the unit was completed by force account. Three hundred twenty AF of pumped and fall runoff water was retained to raise levels and provide habitat for migrating waterfowl. Bald eagles were present from October to December with a peak of six birds on November 11th. Dark geese peaked with a record 20,000 Canada geese in mid-December. White geese peaked at 1,000 in November. The year end water level was lower than planned.

Unit II water management was similar to Unit I. Early levels provided habitat for spring migrant waterfowl including, 750 tundra swans, and 1,000 northern pintails. Foraging habitat was provided for American white pelicans, white-faced ibis, black-necked stilts and black terns and nesting habitat for Forster's tern and black-crowned night-heron. Breeding shorebird use in June was highlighted by 300 American avocets and 730 Wilson's phalaropes on the 4th, and 24th respectively. Marbled godwits peaked on July 13th at 895 birds including many young-of-the-year.

Summer shorebirds totaled 2,250 in late July including more than 1,600 long-billed dowitchers peaked on August 19th with 5,000 and use continued into the fall with 1,490 on September 16th and 730 still present on October 7th. Greater and lesser yellowlegs peaked at 420 on August 19th. Killdeer numbers in August were the most ever recorded on the refuge. On August 12th 463 killdeer were counted on the refuge with 362 birds in Unit II. The previous record was 248 on June 8, 1990. A single peregrine falcon was sighted in August on the 18th and 24th.

A fall prescribed burn was conducted in the marsh basin north of the Lake Creek channel on October 8th The burn was used by 50 killdeer on October 11th after the area was re-flooded. Fall pumping delivered 450 AF to the planned level. Fall use was highlighted by 4,000 mallards, 1,000 white geese on December 2nd and 10,000 Canada Geese in mid-December. Year end levels were at the planned elevation.

Unit III received 350 AF of water in the spring which provided habitat for migrating and nesting waterfowl and shorebirds Tundra swans peaked on March 15th with 1,000+ present. Northern pintails peaked three days later on the 18th with 10,000. Natural drawdown during the summer kept botulism losses to a minimum; *only nine dead birds* were found. Fall pumping provided nearly 700 AF and supported 5,000 mallard and 600 snow geese on November 11th. Year end levels were slightly higher than planned.

Unit IVa received 150 AF of spring runoff and pumped water from Unit II that created ideal conditions for 5,000 northern pintails on the 15th of March. Habitat conditions were ideal

for breeding waterfowl and black-necked stilts and foraging white-faced ibis. Marbled godwits peaked on July 6th at 110.

Fall transfers of 150+ AF from Unit II provided quality migrant waterfowl and shorebird habitat. Bald eagles and peregrine falcons were present in October. Year end levels were 120 AF less than planned.

Unit IVb remained dry most of the year. A prescribed burn was conducted on October 29th to remove the accumulated forb litter prior to re-filling this marsh that had been dry for two years. After the burn 550 AF were transferred to the unit attracting thousands of mallards and Canada geese and a few bald eagles during the next two months. Year end levels were higher than planned.

Unit IVc received nearly 600 AF of water in the spring and early summer which provided wetland habitat for nesting Franklin's gulls and black terns. Franklin gulls began nest building in early spring but surprisingly abandoned the colony. No successful nesting was documented. Cattail stands provided nesting habitat for nesting black-crowned night-herons and white-faced ibis. Early summer shorebirds were highlighted by 46 black-necked stilts, 261 marbled godwits, and 300 yellowlegs in early July. Fall pumping delivered 580+ AF to help accommodate waterfowl migration and the refuge hunting program but year end levels were 140+ AF below those planned.

Unit V received 630 AF from April-June. Tundra swan and northern pintail use peaked in mid-March with 560 and 2,000 birds respectively. Late spring and summer levels provided duck brood habitat and nesting habitat for Forster's tern (2 nests on 6/3), common (37 nests on 6/3) and black terns and black-necked stilts.

During late summer and early fall this unit was nearly dry and shorebird habitat was ideal with nearly 5,450 birds present on August 12th. Use was dominated by nearly 2,000 long-billed dowitchers and 3,000 "peeps". Breeding shorebird use was highlighted by 400+ Wilson's phalaropes and 378 American avocets in early June and 780 marbled godwit in mid-July. Franklin's gulls returned to the refuge in July and August and over 50,000 were present in Units V and VI on August 7th.

Minor botulism losses occurred, during July and August, with a total of 12 dead birds found. Fall water transferred to the unit totaled 350 AF to support the refuge hunting program but year end levels were 400 AF below planned levels.

Unit VI received 160+ AF in April and May, 100+ AF in June and 80 AF in early July. Spring use was highlighted by 500 tundra swans in early April. Spring and early summer nesting habitat supported waterfowl, Franklin's gulls, black-necked stilts and Forster's and black tern. Franklin's gulls, initiated nesting again this year but abandoned the colony and departed the refuge in early June. Shorebird use peaked in August with 2,000 on the 19th and 4,200 on the 26th. Long-billed dowitcher were the most abundant with 1,000 and 3,500 birds on the 19th and 26th respectively. A portion of the unit was burned by a wildfire in August and an additional 183 acres were prescribed burned on October 7th. The burn area attracted 500 shorebirds including 27 black bellied plovers on October 15th as it was reflooded. End of year water levels were at target elevations.

In other wetland related activity, most actions in the 1991 Contaminants Action Plan were put on hold due to a lack of funding. Basic water quality monitoring and ground water monitoring were preformed as per established protocol. No biological monitoring was performed.

Without money for landowner assistance, little work could be done in the watershed to clean up the saline seeps that are the source of the contaminant problem. A handful of local producers continued to pursue alternative crops (i.e. peas, lentils, garbanzo beans) because they absorb water that contributes to saline seeps. Traditional wheat and barley farmers were carefully watching the economic outcome from these experimental plantings. Several of these traditional farmers would like to market alternative crops, however, equipment changes associated with the planting and harvest process result in high farm expenses.

Staff implemented two of the selenium reduction techniques recommended the Montana State University Cooperative Research Unit. Findings from previous Coop studies indicate that exposing mud to warm, evaporative conditions increases microbe activity and therefore increases selenium volatilization. Water levels within highly contaminated wetland Units I and II were drawn down, leaving exposed mud for selenium volatilization. Staff also burned wetland vegetation in Unit II, which also has been shown to increase selenium volatilization as well as removing selenium from the biotic food chain.

8. Haying

In June refuge dense nesting cover (DNC) fields were evaluated and 92 acres in three sites were selected for haying. Bids were requested on a per acre basis. There was more interest in the hay this year than in any year since the bid program was started. Five parties submitted bids. Ron Lee was successful at $11.17 per acre. This was a $7 per acre increase over the bid in 1997. Lee began swathing and baling a few days after the July 15 permit date and removed the bales as work progressed. Tracts hayed included the west half of DNC field 1d, 19.76 acres, the center one third of DNC field 2, 37.43 acres, and the center one-third of DNC field 6, 35.3 acres. A tonnage production estimate was not made this year.

A free haying permit was issued to David Shane to harvest hay on the Bootlegger Trail right-of-way. For several years this permit has rotated annually between Shane and Ron Lee, both refuge neighbors. The permit is effective July 15 each year to avoid the primary nesting season for upland nesting birds and is used to manage plant growth along the county road. This reduces right-of-way maintenance costs for Cascade County and the refuge. Cutting the vegetative growth along the road margin is essential to reducing snow drifts on the road during winter.

9. Fire Management

Wildfire activity on the refuge was about average with three fires noted for the year. The first was a lightning fire on June 9 which burned less than a tenth of an acre in the Mullan Trail Research Natural Area. Spread of the fire was limited by the high amount of fresh

On August 25th, sparks from this damaged transformer line ignited grass near the Muddy Creek Pump House. The local Volunteer Fire Department responded to the fire after a community member reported seeing smoke. Only 2.5 acres of grassland burned prior to the fire being extinguished.

MLM **8/98**

green growth in the fuel and was quickly extinguished by rainfall. The burn was not discovered until the next day. The second fire also resulted from lightning, but, it came on August 20, when refuge grasslands were much dryer. Because winds off the thunderstorm were pushing the fire, mutual aid assistance was immediately requested from Cascade County. Fortunately a wind shift pushed the head of the fire into the open water of marsh Unit VI. Refuge staff and six units from local volunteer fire departments responded. However, before any fire teams could attack the fire, a heavy downpour ensued and reduced the firefighting contingent to observer status. Forty-four acres of prairie and marsh vegetation were burned.

The third burn was a little more unusual. On August 25, only a couple of days after the refuge started the pumps at Muddy Creek, wiring on one of the pump station transformers shorted, possibly due to lightning, and the sparks caused a grass fire. Smoke was observed by a citizen a mile northeast in Power, Montana, who reported it to the local rural fire department. Although the fire was hemmed in by Muddy Creek and the nearby railroad, the volunteers were essential to controlling the fire at only 2.5 acres. The Teton County Sheriff's Department notified the refuge about the fire after it was out. With all the help from Mother Nature and good neighbors, refuge fire staff was aced out of a single minute of fire line duty on this year's wildfires.

In March McCollum completed the revision of the MOU with Chouteau County for mutual aid in fire suppression. A meeting with the county commissioners to discuss and sign the document cemented the arrangement for another three years.

Staff did get to spend a some time playing with fire this year, however, it was all related to prescribed burning. The refuge conducted five spring burns totaling 312.3 acres and three fall burns totaling 563.7 acres, probably the most in refuge history. All the spring burns were conducted in the period from April 2 to April 9. The fall burns were conducted in October. Dry windy fall weather which resulted in daily burning bans in Cascade County interfered with scheduling of these late season burns. Table VII provides information about each of the burns.

TABLE VII

Prescribed Burning Accomplishments - 1998

Fire Name	Date	Primary Habitat	Acres	Objective
DNC 2	4/2/98	Upland	2.3	Crested Wheatgrass control
5/6 Dike	4/2/98	Upland	12.0	Road maintenance, vegetation rejuvenation
Unit 4c	4/3/98	Wetland	173.0	Vegetation rejuvenation
Unit 2	4/9/98	Wetland	65.0	Vegetation rejuvenation
Entrance East	4/9/98	Upland	60.0	Cheat grass reduction

A few of the fire "Canaries" working during prescribed burns in FY98.

Upper Left: G. Brewer and S. Martin
Center: G. Brewer
Lower Left: R. Johnson

Fire Name	Date	Primary Habitat	Acres	Objective
Unit 6	10/7/98	Wetland	183.0	Wildlife habitat enhancement,
Unit 2 North	10/8/98	Wetland	152.0	Wildlife habitat enhancement,
Unit 4b	10/29/98	Wetland/ upland	228.7	Wildlife habitat enhancement

One of the more interesting effects of the fall wetland burns was the bird response. After the Unit VI and Unit II North tracts were burned, water was added to both units to flood a portion of the burned areas. Almost immediately, up to 50 killdeer and 100 American pipits moved in to feed along the margins of the encroaching water in Unit II. Among over 350 dowitchers and lesser yellowlegs in Unit VI, were 27 black-bellied plovers and four lesser golden plovers.

One of the more unusual and unfortunate incidents ever to happen in the experience of current refuge staff occurred in the marsh Unit II burn. An area of dense cattail and creeping fox-tail grass, the area is often occupied by several white-tailed deer. After driving ATVs thru the area, the burn boss believed all the deer had been flushed out. That was not the case and four deer were trapped by the fire and had to be dispatched after the burn. The incident caused the staff to conduct a review of the burn and develop some new prescribed burning procedures to ensure a similar occurrence does not happen again.

10. Pest Control

In March the Montana Department of Agriculture completed an inspection of chemical storage facilities and application records for the Benton Lake Complex. No problems were found.

Plant pest control this year consisted of both chemical and manual methods. Small infestations of **spotted knapweed** were hand pulled on two occasions during the early summer. A few plants that could not be pulled along the pavement edge of Bootlegger Trail were spot treated with Curtail. This repeated hand pulling and spot treatment has reduced the knapweed along the highway to a few scattered sites. After several years of plant removal before seed production, only 20 to 25 plants were found this year. It is apparent though, that eternal vigilance is the price of freedom from this noxious invader. New infestations are repeatedly planted by traffic along the highway.

Several new **musk thistle** infestations were located on the refuge this summer. Most of these plants were hand pulled or grubbed out by the summer YCC crew. First year rosettes of this biennial were spot treated with Curtail in two sites that totaled about one acre. All of the musk thistle infestation locations were documented using the station global positioning system instrument.

YCC crew members and seasonal staff work to eradicate the musk thistle that is slowly invading the refuge. Thistle patches were mapped for easy relocation next year.

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Canada thistle is endemic to refuge disturbed sites such as dike banks, wetland margins and road sides on the refuge. Spot treatment with Curtail is effective and is used along the refuge entrance road and along Bootlegger Trail to suppress plants as they appear. Seed head weevils are becoming more prevalent but are likely to have minimal over all effect on presence of the plant.

At the Muddy Creek pump station, both musk thistle and spotted knapweed are abundant. Annual spot spraying and pulling are barely keeping even. Seed head weevils infest almost all musk thistle plants but enough seed survive to maintain or increase the plant population.

No leafy spurge was found on the refuge this year.

11. Water Rights

In December 1997 we learned of newly filed claim for irrigation water on Muddy Creek. The point of diversion would be about a mile upstream from the refuge pump station. Although the new claim would be junior to the refuge water right, we encouraged the Regional Water Resources Division to file an objection in order to enter into discussions with the claimant about the proposed irrigation project.

Power area farmer Dan Andrews was requesting use of six cubic feet per second for irrigation use under a Teton County water use reservation. After a substantial amount of discussion and several meetings with Mr. Andrews, Teton County Conservation District representatives, and the Montana Department of Natural Resources and Conservation, an agreement was reached. The Service withdrew its objection with the understanding on the part of all parties that the refuge and Mr. Andrews would provide each other a plan of operation each year for their respective pumping plans.

This new venture will require increased advanced planning on the part of refuge staff in the future. Although it is expected that most conflicts for periods of use can be avoided by good communication, there may be times when Mr. Andrews will be required to curtail his irrigation when the refuge has a high demand for water. Only time will tell whether these amicable agreements will be effective when the refuge has a water requirement at the same time the crops need irrigation.

G. WILDLIFE

1. Wildlife Diversity

Implementing management practices that support the concept of species diversity requires baseline data for wildlife and their associated habitats (See F.1). Baseline data is also crucial to the NWR System Improvement Act of 1997, the FWS Ecosystem Approach to Management, Comprehensive Conservation Planning and assessment of refuge compatibility issues. Existing baseline data for Benton Lake is extensive for duck nesting including Mayfield success and densities in four major habitat types. Data for non-waterfowl species is less extensive although all refuge bird sightings from 1929-98 are stored in a computer database containing nearly 9,000 records.

Efforts to expand baseline wildlife data have been ongoing since 1994. The focus of our efforts is on birds since the refuge enabling legislation identified the purpose of Benton Lake as a "refuge and breeding grounds for birds". Data is collected on all birds with emphasis on point count monitoring of non-game birds in native prairie (See D.5) and species identified by the Montana Natural Heritage Program (MNHP) as Species of Special Concern(SSC).

SSC include those protected by the Endangered Species Act, candidate species and species the MNHP considers at risk because of declining numbers, rarity or limited distribution in Montana. SSC known to nest or suspected to nest on the refuge include; Ferruginous hawk (G.6), burrowing owl (G.6), black-crowned night-heron (G.4), white-faced ibis (G.4), Franklin's gull, black, common and Forester's tern (G.5), black-necked stilt (G.5), loggerhead shrike (G.7) and Baird's sparrow (G.7). Non-nesting SSC include; bald eagle (G.2), peregrine falcon(G.2), northern goshawk (G.6), common loon, Clark's grebe (only 4 refuge records, none in 1998), trumpeter swan(only 3 refuge records, none in 1998) and American white pelican (G.4).

2. Endangered and/or Threatened Species

Peregrine falcons were sighted ten times this year from April to November. The following Table VIII contains the number of sightings on the refuge from 1995-1998.

Bald eagles were sighted nine times, from March-April and October-December, compared to fourteen in 1997. Peak numbers occurred on November 10th with two adults and four immature birds.

TABLE VIII

PEREGRINE FALCON SIGHTINGS BY MONTH: 1995 - 1998											
YEAR	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL
1998	0	0	2	2	0	0	3	2	0	1	10
1997	0	0	2	8*	1	1	6	2	2	0	22
1996**	0	0	2	11	6	1	4	2	0	0	26
1995	0	0	1	7	6***	5	5	2	0	0	26
* Adult pair on 5/12/97. **1996 records are all single birds. ***Two birds 6-28-95											

3. Waterfowl

Ducks

Mallards began arriving in late February and **northern pintails** in the 2nd week of March. Pintails peaked at 20,000 on March 18th. Large feeding flocks of 10,000 or more birds swarmed down on wheat stubble fields adjacent to the refuge. Fall pintail numbers were less impressive but mallards were abundant with 5000-10,000 present from mid October until mid December, including 5200 on December 14th.

Duck nest searches were conducted on 106 acres of Dense Nesting Cover (DNC) and 300 acres of native grassland (NGL). Nest dragging was conducted from May 13th-June 22nd. Species composition of 48 nests found and the number in each habitat type are shown in Table IX. Apparent nest success was 83% and 80% for NGL and DNC, respectively, although this estimate is of little value due to the small sample size of nests. In lack of nests found is though to be related to duck nest destruction during early incubation by American Crows. Evidence for crow predation is based on visual observations of crows eating or carrying eggs and the lowest densities ever recorded on the refuge. NGL nests/acre was .026 compared to .056 in 1997, the previous lowest density. DNC densities were .24 compared to last years average of .68 nest/acre.

The expanding breeding population of American crows is the result of the planting of over 30 miles of carragana and Russian olive shelterbelts by refuge neighbors which created an the ideal nesting habitat for crows as well as black-billed magpies . An estimated 20 pairs of crows use the refuge as a feeding area and are adept at finding ducks nests. Future waterfowl management for upland nesting ducks on the refuge will need to address this predation problem and expand control efforts that previously have focused on striped skunks and raccoons .

TABLE IX

DUCK SPECIES AND NUMBER OF NESTS BY HABITAT

SPECIES	NUMBER OF NESTS	
	DNC	NGL
Gadwall	16	1
Northern Pintail	6	5
Northern Shoveler	9	2
Mallard	6	0
American Wigeon	1	0
Green-winged Teal	1	0
B.W./Cinn Teal	1	0
TOTAL	40	8

Geese

Canada goose numbers in March totaled 1425. An estimated 400 pairs nested with a estimate of 700 gosling produced to flight stage. Fall numbers were high again and similar 1997 with 3500-20,000 birds from October thru mid-December. Peak numbers occurred on December 1st with 20,000 Canada geese. Over 75% of these were small race Canada's although some appeared to be large bodied with shorter bills, necks, legs and wings than the common large race of ***Branta canadensis moffitti***. Several hunter killed birds examined weighed just over nine pounds with measurements most similar on ***B.c. fulva.*** This race is chiefly a resident of coastal British Columbia north to southern Alaska and wintering south to northern California.

Snow geese began arriving in early April although numbers were below average with peak numbers near 100 by mid month. **Ross' geese** were sighted only once with 24 accompanied by 12 snow geese on April 20th. Fall migrants began arriving in early September and peaking at 1500 in mid-November and 1010 on December 2nd. Ross' geese peaked at 300 on November 2nd. The last sighting of white geese this year, a flock of 150 birds of both species, occurred on December 14th.

Swans

Tundra swans began arriving on March 12th and peaked at 6,500 on the 15th. Nearly all swans departed by mid-April and began returning on September 29th. Fall numbers were below normal with a peak of 150 in mid-November. Of note was the small number of cygnets observed. Of the 150 swans in November only 17 were classified as young-of-the-year. The last swans, 70 birds, were seen on December 14th.

4. Marsh and Water Birds

Marsh and water birds known to nest on the refuge include eared grebe, pied-billed grebe, western grebe (none in 1998), white-faced ibis, black-crowned night heron, double-crested cormorant, sora and two suspected breeding species including American bittern and Virginia rail. A single common loon was sighted on May 15th in the inter unit canal.

White-faced Ibis arrived on schedule this year on April 23rd which is the average arrival date since 1986 when ibis first nested on the refuge . Ibis nested again this year in Unit IVc and VI but formal nest searches were not conducted. The refuge breeding population is estimated at 100+ pairs. This estimate is based on an apparent stable population since 1996 when 103 nests were found. The refuge has the largest known breeding population in Montana.

Black-crowned night-heron arrived on April 20th compared to April 22th in 1997. Formal nest searches were not conducted although nesting was suspected in Units II, III and IVc.

American white pelican arrived this year on the same date as last year, April 10th. A peak of 10-12 birds was far less than last years peak of 71 in May. Most pelicans departed the refuge by June and fall numbers reached 14 on September 1st. Pelican nesting has never been documented at the refuge but a large breeding colony nesting is located in the Wetland Management District at Arod Lake WPA (WMD Narrative G.16).

5. Shorebirds, Gulls, Terns, and Allied Species

Shorebirds

Benton Lake is one of two Region 6 refuges recognized as a regional site by the Wetlands For Americas, formally the Western Hemisphere Shorebird Preserve Network. Work continued this year to identify shorebird use by species, arrival dates, seasonal use and peak population estimates. The highlight of the year was the observation of a color marked **lesser yellowlegs** on June 12th. The bird carried a blue and a silver band on it's left leg and a yellow band and a green flag tab marker on the right leg. A call to Manomet Bird Observatory, WHSRN, revealed the bird was banded in Brazil, South America. Banding details including exact location, date and sex and age have not been received as of year end. Shorebird data on other species is summarized in the following two tables.

Table X

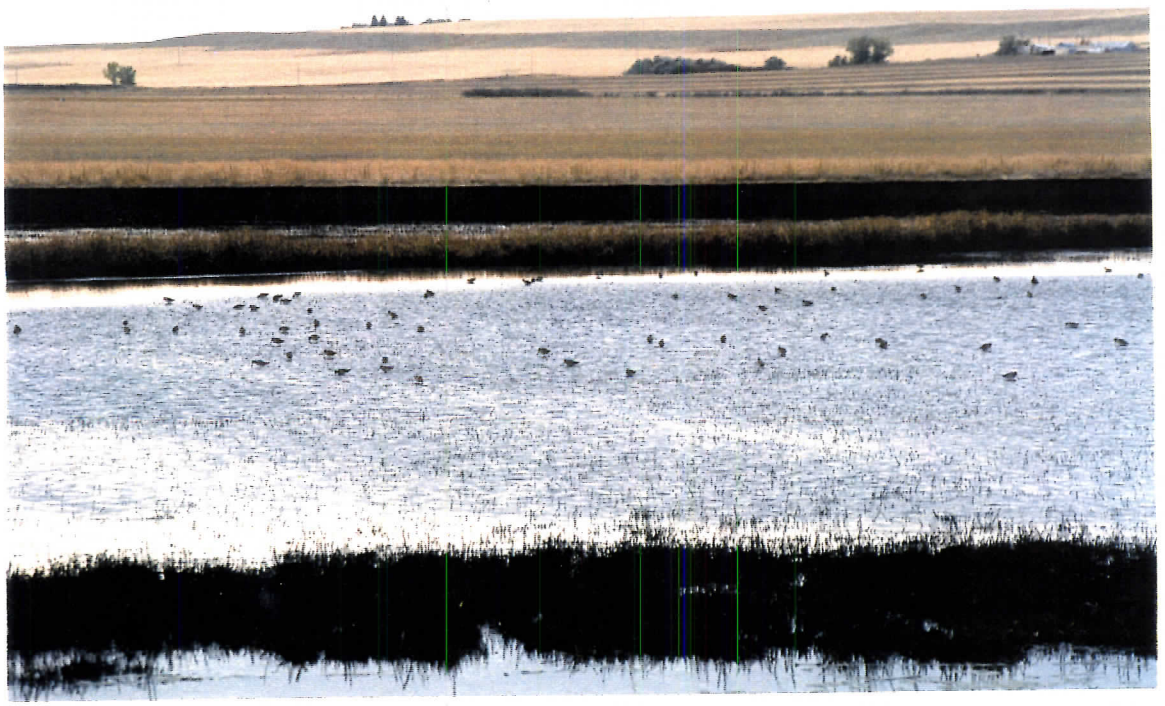
BREEDING SHOREBIRD ARRIVAL DATES BY SPECIES PEAK NUMBERS AND DATE 1998			
SPECIES	ARRIVAL	PEAK	DATE
Wilson's Phalarope	4/24	1242	6/24/98
American Avocet	4/7	588	4/27/98
Black-necked Stilt	4/13	176	4/27/98
Marbled Godwit	4/20	928	7/22/98
Willet	4/22	159	6/30/98
Killdeer	3/19	463	8/12/98
*Upland Sandpiper	5/6	18	6/15-19
Spotted Sandpiper	4/30	6	7/22/98
**Long-billed Curlew	4/17	86	8/5/98
***Common Snipe	4/29	2*	8/12/98

*Number detected on grassland point counts (6/15-19).
*Nesting by Long-billed Curlews last documented on the refuge in 1983.
*** Common Snipe nesting suspected but not documented

Table XI

NON-BREEDING SHOREBIRDS USE DATES AND PEAK NUMBERS DURING SPRING AND FALL MIGRATION, 1998				
SPECIES	SPRING USE	PEAK	FALL USE	PEAK
Long-billed Dowitcher	4/24 - 6/10/98	249-May 6	7/9 - 10/22	5000-Sept 18
Greater Yellowlegs	4/13-6/30/98	14-June 28	7/14 - 10/22	20-July 14
Lesser Yellowlegs	4/27/98 -5/21/98	22-May 17	6/24 - 10/22	400-Aug 19/98
UID Yellowlegs Spp	4/27-5/6/98	186-Apr 27	6/24-10/22/98	428-June 24
Red-necked Phalarope	5/20- 6/3/98	26-May 21	7/6 - 8/26/98	277-July 29
Baird's Sandpiper	3/31-5/6/98	39-May 6	7/22-10/15/98	286-Sept 2
Pectoral Sandpiper	5/6/98	4-May 6	7/22-10/22/98	29-Aug 16

In preparation for a fall prescribed burn, the Unit II wetland was drawn down which created mud flats and shallow water habitat that attracted shorebirds and Franklin's gulls.
SJM **9/98**



Shorebirds responded positively to burned alkali bulrush after it was flooded in September.
SJM **9/98**

NON-BREEDING SHOREBIRDS USE DATES AND PEAK NUMBERS DURING SPRING AND FALL MIGRATION, 1998				
Stilt Sandpiper	5/6-5/21/98	69-May 21	7/22 - 9/16/98	32-Aug 26
Solitary Sandpiper	not recorded in 98	----------	----------	----------
Western Sandpiper	4/13-5/21/98	30-April 27	7/22-8/19/98	120-Aug 8
Semipalmated Sandpiper	4/27/98-5/21/98	6-May 21	7/22-9/15/98	80-Aug 5
Least Sandpiper	5/6-5/21/98	1-May 21	6/30-9/16/98	135 Aug 5
Sanderling	0	0	8/26-9/16/98	32 Aug 25
Whimbrel	5/21-23/98	11-May 21	7/29-8/12/98	8 Aug 12
Black-bellied Plover	5/6/98	2-May 6	7/22-10/15/98	27-Oct 22
Semipalmated Plover	0	0	7/22-8/26/98	7 -Aug 19
Ruddy Turnstone	5/21/98	1-May 21	8/12-8/19/98	2-Aug 12
UID Small Shorebirds	4/27-5/21/98	18-Apr 27	6/24-10/22/98	2936 Aug 12
UID Large Shorebirds	0	0	7/22-10/15/98	500 Aug 26

Black-necked stilts arrived on April 13, nine days before their average arrival date. Formal nest searches were not conducted although nesting was observed in Unit II(N=10) and suspected in Units IVa, V, and VI. Stilt use is also included in discussions of water management and wildlife use (See F.2).

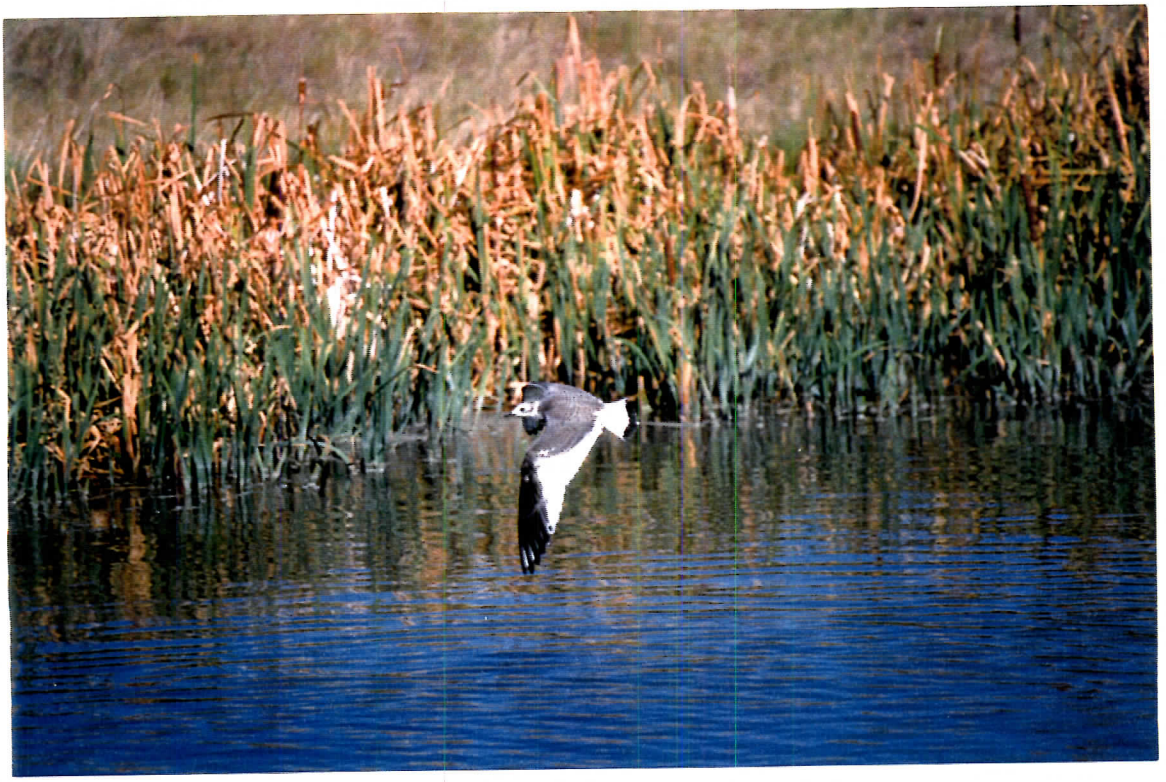
Gulls

Efforts to reduce the number of nesting **California gulls** continued this year with the number of nests estimated at 800 compared to 760 in 1997 and 1,250 in 1996 prior to implementing nesting reduction efforts. Initial efforts in 1996 to discourage gull nesting began with lowering the height of the primary nesting island of 3,000 pairs of California and **ring-billed gulls**. Gull response last year included the abandonment of nesting sites by ring-billed gulls and reduction of California gull nesting by 50%.

Gull response this year was similar to last year with no nesting by ring-billed gulls and California gulls seeking new nesting sites on islands and along dikes. Periodic visits to colonies in early stages of nesting and the use of pyrotechnic scare devices caused some abandonment and egg destruction by gulls. Tentative plans include non-lethal reduction to a refuge objective level of 100-200 nesting and non-nesting birds. If passive reduction is not possible some form of active removal maybe employed.

Benton Lake is the site of Montana's largest breeding population of **Franklin gulls**. Franklin gulls arrived this year on April 7th, one day later than 1997. Nesting began in Units IVc and VI but both colonies were abandoned for unknown reasons. Later in the summer adults and young returned to the refuge marshes and congregated primarily in marsh units V and VI with a peak of 50,400 birds on August 7th.

This immature Sabine's gull was one of two observed on the refuge in September. Note the black primary feathers, banded tail and contrasting brown back; these are all identification clues. Local birders were afforded with plenty of close-up viewing opportunities.
SJM **9/98**



Two **Sabine's gulls** made a rare visit to the refuge this fall. This arctic nesting gull had been sighted only five other times at Benton Lake, the most recent in May 1987. The first bird was sighted on September 11th and was last seen on September 21st. The second bird was sighted on the 17th with the first bird and was not seen again. Both gulls were immature and identified as Sabine's by their unique plumage on the wings and tail (See photograph for identification characteristics).

Terns

Black terns arrived on May 19th three days later than the average arrival of May 16th. Nesting was suspected but unconfirmed in Units I, II, III, IVc and V.

Forster's terns arrived on April 30th, seven days earlier than the average arrival date of May 7th. Formal nest searches were not conducted, but incidental nests found included two on June 3rd in Unit V and one in Unit III on June 11th.

Common terns arrived on April 29th. An island search for gull nests located 37 nests on an island in Unit V on June 3rd.

6. Raptors

Raptors confirmed nesting on the refuge this year included, Swainson's Hawk, ferruginous hawk, northern harrier, burrowing owl, and short-eared owl. Other raptors sighted included bald eagle and peregrine falcon (See G.2), golden eagle, osprey, prairie falcon, American kestrel, merlin, gyrfalcon, Cooper's hawk, sharp-shinned hawk, red-tailed hawk, rough-legged hawk, great-horned owl and long-eared owl.

Northern goshawk occasionally visit the refuge during the fall or winter but none were sighted this year. The **ferruginous hawk** arrival date this year was March 24 about one week earlier than normal. One pair of ferruginous hawks nested on the refuge this year. Last year two pairs nested on the refuge for the first time since 1984. Both nests in 1997 successfully fledged three young. This year's nesters used a site in shelter belt #18 located 1.5 miles north of the headquarters. The nest contained three chicks on June 19th All three fledged. Another nest of ferruginous hawks with at least two young was sighted on June 29th atop a 40 foot cottonwood tree on private land 2.3 miles north of the refuge.

Burrowing owls were first seen on April 23rd this year which is also the average date. Nine pairs nested on the refuge this year, the most ever documented.

7. Other Migratory Birds

Two new birds were added the refuge list in 1998. A **chestnut-sided warbler** and a **red-naped sapsucker** were sighted in the headquarters shelter belt on the 9th and 10th of September, respectively. The official refuge bird list now includes 239 species, recorded from 1929-1998.

MJP 6/98

These fifteen day old loggerhead shrikes are ready to fledge. Six of seven eggs hatched around June 8th. All six can be seen in this photo. Can you find them?

Baird's sparrow, a former C2 candidate for ESA listing were detected on three occasions during point count censuses this year. The first Baird's sparrow was found on June 12th and three were detected within 100 meters on point counts between June 15 -19. All detections involved only singing males and efforts to document nesting were unsuccessful.

Two **loggerhead shrike** nests were located this year, compared to 4, 0, 5, 4, in 1997,1996, 1995 and 1994 respectively. The nests were found on May 19th in Russian olive trees in shelter belts #11 and #14. When found, one contained six eggs and the other one egg. Full clutches were six and seven eggs respectively, all of which hatched. Each nest was believed to have produced three fledglings to flight stage.

Two Breeding Bird Surveys (BBS) were run again this year. Volunteer Karen Stutzman runs the Highwood Route and assistant manager Martin the Great Falls Route.

8. Game Mammals

Record numbers of **white-tailed deer** were present throughout the year. Numbers peaked in December with 118 deer animals primarily in marsh Units I (N=66), III (N=12) and Iva (N=40). The increased deer population is likely related to extensive tracts of grassland cover on private lands enrolled in the CRP program of the U.S. Department of Agriculture. (See G.10)

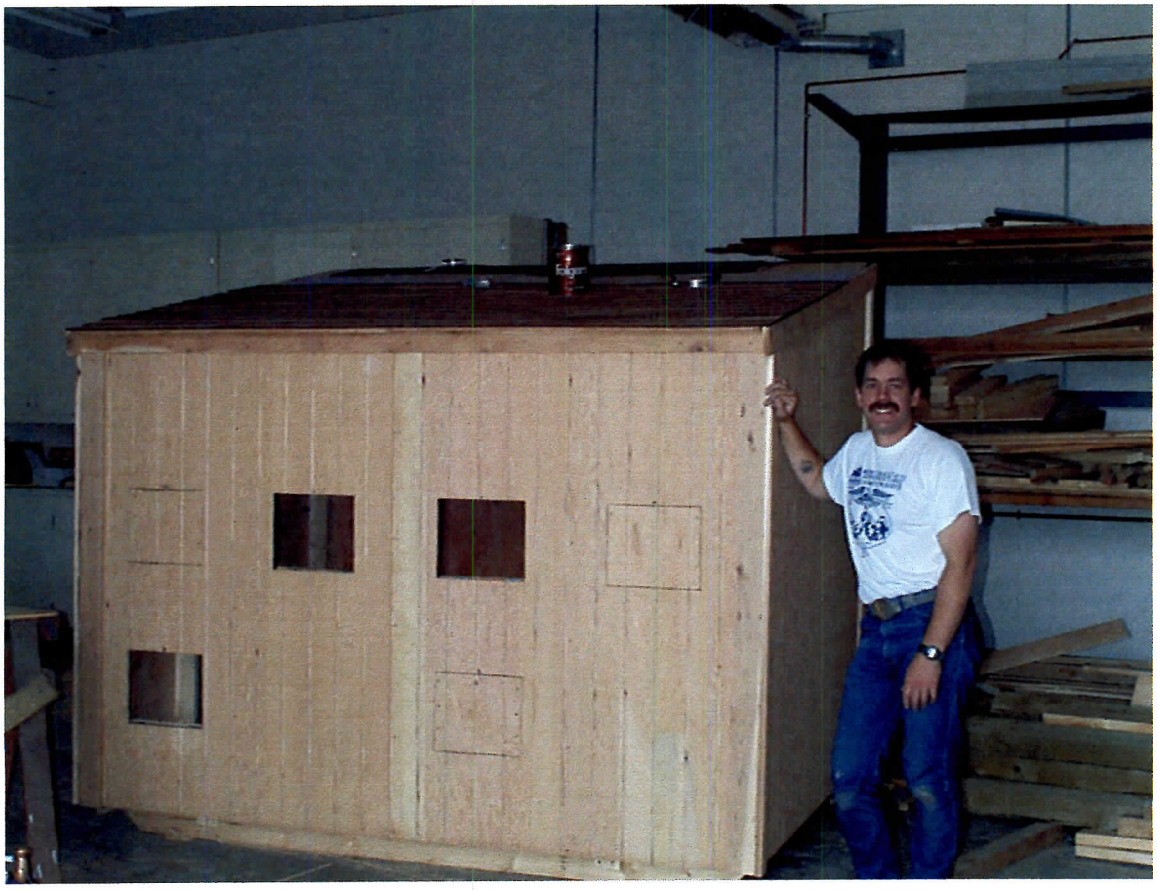
A herd of eight to ten **mule deer** were observed on several occasions in the "breaks country" in the southeast corner of the refuge. A lone doe was observed in the headquarter's shelter belt in early June which is very unusual on Benton Lake.

Pronghorn antelope are seen infrequently on the refuge and these observations usually are of lone animals or small groups of three to six. An unusually large herd of 22 animals were sighted on July 27th, on private land along the west boundary in the vicinity of Lake Creek. A group of four antelope were sighted several times in early May on the east of the Bootlegger Trail and once on the westside, where they are seldom seen.

10. Other Resident Wildlife

Resident gamebirds on the refuge include **ring-necked pheasant**, **gray partridge** and **sharp-tailed grouse**. Formal surveys are not conducted for pheasant and partridge but incidental observations indicated an average nest/hatch year.

The sharp-tailed grouse dancing ground (Lek #1) located along the auto tour route was active for the ninth consecutive year. The number of displaying males on each known lek is summarized on the following page, Table XII.



Volunteer Jay Hayden putting the finishing touches on the new "Grouse House" that he designed using staff and public recommendations. Funding for the sharp-tailed grouse viewing blind was provided by the Watchable Wildlife Program.
MLM 8/98

TABLE XII

YEAR	LEK #1	LEK #2	LEK #3	LEK #4	TOTAL
1998	45	0	6	0	51+
1997	41	0	5	4	54
1996	40	+	12	+	52
1995	43	15	14	10	82
1994	40	6	N/A	N/A	46
1993	40	6	N/A	N/A	46
1992	43	+	N/A	N/A	43+
1991	40	6	N/A	N/A	46
1990	31	9	N/A	N/A	40
1989	12	N/A	N/A	N/A	12
1988	8	N/A	N/A	N/A	8

Note: + = birds present but number of males not determined

The expanding grouse population is believed to be a result of land use changes on private lands surrounding the refuge. Thousands of acres of former cropland have been taken out of production and placed in the Conservation Reserve Program (CRP). CRP tracts are seeded to permanent grass cover providing nesting, brooding and winter habitat for a variety of wildlife including sharp-tailed grouse.

15. Animal Control

The refuge is authorized to use lethal control for striped skunk and raccoon management. The plan authorizes predator control if duck nest success is less than 60% Mayfield in each of the refuge upland habitat types.

Trapping began on April 26th and continued through July 9th (See Table XIII). Removal methods included kill trapping with Conibear model 220 traps in cubby box sets and live trapping with cages. Live trapped animals were destroyed by shooting or euthanized with drugs administered with a jab-stick. Traps were inspected daily and all live trapped non-target animals released. Five skunks and two raccoons were removed compared to one skunk and five raccoons in 1997.

TABLE XIII

NUMBER OF TRAP NIGHTS AND SKUNKS AND RACCOONS REMOVED			
Month	No. Skunks	No. Raccoons	Trap Nights
April	1	0	141
May	2	2	1362
June	2	0	1280
July	0	0	240
TOTAL	5	2	3023

16. Marking and Banding

Preseason mallard banding was conducted from September 9th - October 2nd . Low early water levels and then rising levels during water pumping complicated trapping and consequently few ducks were banded this fall. The number of mallards banded in the last five years in shown in Table XIV. One canvasback was also banded.

TABLE XIV

MALLARDS BANDED AT BENTON LAKE NWR, 1994-98					
Year	AHY-	AHY-F	HY-M	HY-F	Total
1998	69	21	54	26	170
1997	101	124	524	299	1048
1996	0	0	0	0	0
1995	1149	261	570	296	2276
1994	744	234	635	363	1976

17. Disease Prevention and Control

Avian botulism losses are shown in Table XV. Airboat patrols in late July and August detected some dead birds believed to be botulism mortalities. The number of dead birds picked up by marsh unit included; Units I = 10, II = 0, III = 8, IV = 0, V = 12, VI = 5, and Inter-unit canal = 0.

TABLE XV

BOTULISM LOSSES AT BENTON LAKE NWR, 1994-1998

Year	Number of Dead Birds
1998	35
1997	88
1996	85
1995	0
1994	0

H. PUBLIC USE

1. General

Public use on Benton Lake National Wildlife Refuge is principally wildlife oriented. Wildlife viewing, wildlife photography, environmental education and waterfowl hunting are the main activities. Public use visits to the refuge this year were estimated at 10,275 compared to 10,020 and 9,417 in 1997 and 1996 respectively.

2. Outdoor Classrooms-Students

The refuge annually hosts the Great Falls Public School Environmental Education Program. The program is taught by teachers and includes elements on water, plants, soils and wildlife. Approximately 2,000 third and seventh graders visited the refuge this year in May.

5. Interpretive Tour Routes

April through October visits to the Prairie Marsh Drive ranged from 760-1000 per month. Although the tour route remains open year around, winter time visits are almost non-existent.

6. Interpretive Exhibits/Demonstrations

Benton Lake again coordinated a "Montana Refuges" exhibit and information booth at the Montana State Fair in Great Falls. Fourteen refuge personnel from the seven Montana NWR's staffed the booth from July 25th through August 2nd. The exhibit was housed in the "Natures Den" along with the Montana Department of Fish, Wildlife and Parks, National Park Service, Bureau of Land Management and the U.S. Forest Service. Visits to the exhibits were estimated at 12,000.

Bio. Tech Bob Jordan gives a verbal description of a duck to a 16 year old blind girl from the Montana School for the Deaf and Blind. Students were allowed to feel banded birds prior to releasing them back into the wild. This experience was life changing for <u>all</u> involved. Staff members were reminded to appreciate all the small wonders in life that we take for granted.

SJM 9/98

This 8th grade student accompanies Bio. Tech. Meade as she conducts a waterfowl survey. Refuge staff frequently participate in "Job Shadowing" programs associated with the local Middle Schools.
MLM 10/98

Bio. Tech. Piercy leads a discussion about the importance of grasslands to birds with children from the Knees School. Rural educators find that Benton Lake is a terrific learning environment. Younger kids love to participate in scavenger hunts for food sources and nesting material, while older kids are challenged with bird identification and discussions about physical adaptions.

10/98

Various tours and other programs conducted by refuge staff during 1998 are shown below.

Program/Service	Group	Staff
Judging	Great Falls Science Fair (2)	Johnson, Jordan, Meade
Refuge talks	Great Falls :School Deaf & Blind(MSDB)	Sturges
	: LDS Church	Martin
	: North MS Job Shadow	Meade
	Elementary School Programs (4)	Meade, Piercy, Stutzman
	Mt. Audubon State Meeting	Martin
	Scouts (2)	Meade, Piercy
	East Middle School Career Day	McCollum
Refuge Tours	Montana Audubon Annual Meeting	Martin, Piercy
	Partner's In Flight Western Working Group	Martin
	Mt School Deaf & Blind (2)	Martin, Meade, Jordon, Piercy
	Rainbow Retirement Community (2)	Meade, Piercy

8. Hunting

For the second year the refuge participated in Montana Youth Waterfowl Hunting Day on the September 26th. The turn-out of about nine parties of youth hunters was about double the 1997 number.

Although bag limits were liberal and wetland conditions were good, the opening of waterfowl season did not attract a large number of hunters this year. Hunting on the refuge kicked off when waterfowl hunting season opened on October 3rd with only about 50 hunters present on the first morning. Hunter success thru the month was spotty with some having excellent hunts and others encountering few birds. The exceptionally mild, stable weather during the month kept all refuge waters essentially ice free. By month's end, mallard populations on the refuge had built up to 25,600 and provided patient hunters in good locations some excellent shooting.

Normally, waterfowl hunting on the refuge is terminated by cold weather in early to mid-November when ice usually locks up the marshes. Such was not the case this year.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

Work finally began January 2 on a contract issued in September 1997 to S&H Aluminum Products, Inc., Great Falls, for installation of steel siding on the two refuge residences. The work included installation of a layer of foam insulation and a composition wood backing underneath each steel panel. Work was interrupted by cold weather a couple of times but by January 23 the job was finished. Overall the quality of work was excellent. Except for the storm window frames, all the exposed wood on both residences was completely covered with metal. The need for painting or other exterior upkeep should be substantially diminished for many years to come.

For many years the gravel spill ways on marsh Units I and II had caused problems for crossing auto tour route traffic. When water in the marshes was high and crossing the spillways, traffic pounded holes in the spillway surface and some visitors were reluctant to drive through the water. An MMS project to rehabilitate the spillways and water control structures in marsh Units I and II anticipated replacing the gravel spillway crossings with concrete and installing wing walls at the WCSs to keep rocks mud and trash from interfering with the operation of the structure. The project hit a snag during the mid-summer bid letting process. The engineering estimate for the project was $45,000. However, the lowest bid exceeded $60,000. Because there were insufficient funds for the project to award a contract, the refuge took on the job to complete it by force account. Using the plans provided by Region 6 Engineering, refuge staff completed the spillway work in the fall and will complete the WCS modifications in 1999.

The cancellation of the WCS project also freed up funds for other projects on the refuge. One quarter mile of the Lake Creek channel below the Lake Creek flume was clean out. Over 35 years of pumped water and natural stream flow had resulted in heavy siltation of that portion of the channel which occupies an easement right-of-way on the Ewing Ranch. Quotes were requested from local equipment operators and Habel Backhoe Service was the low bidder. Spoil from the project was stacked along side the channel and will be spread in 1999 after it has dried out sufficiently to be worked. Habel also cleaned silt from about 185 feet of channel in front of the water control structure that passes water from Unit II into Unit IV.

Also using MMS funds concrete box culvert was purchased for replacement of the Lake Creek crossing on the Ewing Ranch. This is the last channel crossing on Lake Creek in need of replacement. The culvert will be delivered in early 1999 with installation at a date yet to be determined.

The septic tank at Quarters 82 was replaced in September with an accumulation of Quarters funds carried over from FY97. The old steel tank, installed when the house was built in 1962, had rusted out and was near collapse. The new 750 gallon concrete tank was purchased in 1996 but installation was postponed due to the press of work. When it became apparent that it was not possible to get the project included in the refuge force account work schedule this year, Habel Backhoe Service was contracted to do the installation. A complicating factor arose during the excavation. The buried power line which services the house had been laid over the top of the tank. The cable had to be cut and new

Ground leveling and forming of both the Unit I and II spillways proved to be time consuming. Unit II (shown) was a breeze compared to Unit I which had huge rip-rap boulders under the roadbed. The Auto Tour Route remained open during the project; traffic was diverted to a temporary roadbed adjacent to the spillway.
MLM **9/98**

Unit II spillway after completion.

section of several feet added so the wires could be routed around the north side of the new septic tank.

3. Major Maintenance

Another MMS project included replacement of corners, stress panels and gates in a five miles section of the north boundary fence. Much of the refuge boundary fence was built in the early 1960s. Many of the wood corner posts have decayed at the ground level over the past 35 years and are breaking off. The bottom strand of barbed wire was also removed from this section of four wire fence for improved antelope passage. The steel line posts and barbed wire remain in good condition and were not replaced.

Using the self-loading earth mover borrowed from C.M. Russell NWR, in March Brewer completed the planned modification of the islands in Unit IVb. This project which started in winter 1997 is aimed at reducing the attractiveness of the islands as a nesting site for California gulls. Now that water has been returned to the unit, the effectiveness of the project will be evaluated in 1999 and additional changes planned if needed.

The refuge received $350 from the Burlington Northern-Santa Fe Railroad this year for replacement of a fence corner burned in the 1997 railroad right-of-way fire at Muddy Creek pump station.

4. Equipment Utilization and Replacement

The refuge purchased a new low side dump box as the second bed for the 1997 Ford stake/dump truck. The new bed will be used to haul soil, gravel and other loads which require low sides on the bed. The versatility of this truck continues to dazzle us. The ability to place the bed on the ground, install the load and boom it down, then pull the entire loaded bed back on to the chassis has almost eliminated the need for preparing special loading and unloading facilities in remote locations.

In January a 1995 Ford Ranger 4X4 was transferred from the Realty program at C.M. Russell NWR for use by the Realty program at Benton Lake. Also during the year the refuge inherited a 1990 Dodge 4X4 pickup from the Ecological Services office in Helena. This truck had been used by ES contaminants staff while working on the refuge and was no longer needed for that activity.

Two new Dodge Dakota 4X4 pickups with expanded cabs were received in December. One was an addition to the station fleet and was assigned to Susan McNeal in the Partners for Fish and Wildlife program in Helena. The second replaces a refuge 1993 Dodge Dakota that will be sold.

5. Communications Systems

A network card was installed in Sullivan's notebook docking station.

Because of an anticipated increase in Realty staff at the Complex, a new telephone control system was installed in November by Williams Telecommunications of Helena. The new system provides for up to 24 phone extensions.

6. Computer Systems

In March a Jaz drive was installed in a Partners Program computer and a color printer was purchased in preparation for GIS work. In May Meade and Neudecker worked with Ron Pierce, MT Fish, Wildlife, and Parks, to install Arcview 3.0 on the computer and to transfer Blackfoot River Watershed GIS layers to the network server and Jaz disks. Ron gave an overview of how to use Arcview.

With the growing amount of data in electronic storage, a 9 gigabyte hard drive was installed on the network server to provide additional storage space.

In June the Region 6 Refuge Program provided the refuge a Kodak DC129 zoom digital camera and the associated hardware needed to downloading the electronic photos. As the year progressed and the staff learned its capabilities, it became the camera of choice for documenting refuge activities.

7. Energy Conservation

As a part of the steel siding addition on Quarters 81 and 82, a half inch layer of foam insulation was installed as an underlayment to the siding. This will result in a marginal increase in energy efficiency of the two residences. No additional energy conservation practices were implemented this year.

Equipment Operator Brewer is now "on-line" with CC:Mail. He took to the computer system like a duck does to water.

2/98

Bio. Tech. Meade expressing her appreciation to RO staff members for purchasing a Kodak DC 120 digital camera for the refuge. The camera is easy to use and photos can be downloaded to a computer in minutes.
YCC **7/98**

J. OTHER

4. Credits

McCollum prepared A., B., E.1, E.5 and 6, F.8 thru H.8, 9 and 11, I. and J. Martin prepared D.5, F.1,2, and 5, G., and H.1 thru 7 and 11. Meade prepared E.2 and assisted in editing and assembly. Crete edited and assembled the entire report for printing.

1998 ANNUAL NARRATIVE

REVIEW AND APPROVALS

BENTON LAKE WETLAND MANAGEMENT DISTRICT

Great Falls, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1998

James E McCollum 1/7/2000

Refuge Manager Date

Refuge Supervisor Date

Regional Office Approval Date

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INTRODUCTION

The Benton Lake Wetland Management District (WMD) encompasses some 25,000 square miles of north central Montana, an area roughly the size of West Virginia, making it the largest WMD in the country (Figure 1). Established in 1975, the district is administered by the staff at Benton Lake National Wildlife Refuge and includes 21 waterfowl production areas (WPA's) totaling 14,626 acres. The WPA's range from 80 to 3,734 acres in size and are widely scattered across a ten county area (Figure 2). Fourteen WPA's are located over 100 miles from headquarters making effective management of these units somewhat challenging. Perpetual wetland easements are spread over 90,000 acres of private land in all ten counties, protecting some 6700 acres of wetlands. Perpetual grassland easements protect 3,663 grassland acres and perpetual Western Montana Conservation Easements protect an additional 3,662 wetland acres and 34,416 acres of upland habitat.

Topography, soils, climate and precipitation vary greatly across the WMD resulting in a significant diversity of habitat types. The western portion of the district is dominated by the Rocky Mountains and includes broad valleys interspersed with glaciated wetlands and riparian habitat. To the east lies the prairie pothole region of the northern Great Plains, an intensively farmed area with remnant tracts of short grass prairie and small isolated mountain ranges.

C. LAND ACQUISITION

1. Fee Title

Land acquisition in the district continues to emphasize the acquisition of easements as opposed to fee title lands. Although we still to place a high priority on WPA roundouts, declining O&M funding and limited staff has made it increasingly difficult to manage our existing WPA's much less any new fee tracts. In addition, the use of easements has become a widely accepted method of habitat protection by the landowners, statewide agricultural organizations and the Montana Congressional delegation. Expanding the easement program has enabled us to protect additional habitat while minimizing our direct management costs. No additional land was purchased in fee during 1998.

Approximately 48,000 acres have been delineated for fee purchase in the district. In addition, roundouts are needed for nearly half of the existing WPA's. Since 1975, some 12,403 acres have been acquired in eight counties. An additional 2,222 acres of Bureau of Land Management (BLM) and state lands are managed within the boundaries of three WPA's in the district (Table II).

TABLE II

FEE TITLE ACREAGE BY COUNTY

County	Acquisition Goal	Number of WPA's	Total Acres
Toole	4,675	8	4,331.60
Chouteau	2,500	2	2,140.79*
Cascade	2,000	2	727.46
Hill	1,000	2	378.93**
Teton	2,251	3	1,445.96
Pondera	2,000	1	640.00
Powell	1,300	2	2,644.60
Glacier	2,096	1	94.20
Liberty	2,000	0	0
Lewis & Clark	500	0	0
Totals	20,322	21	12,403.54

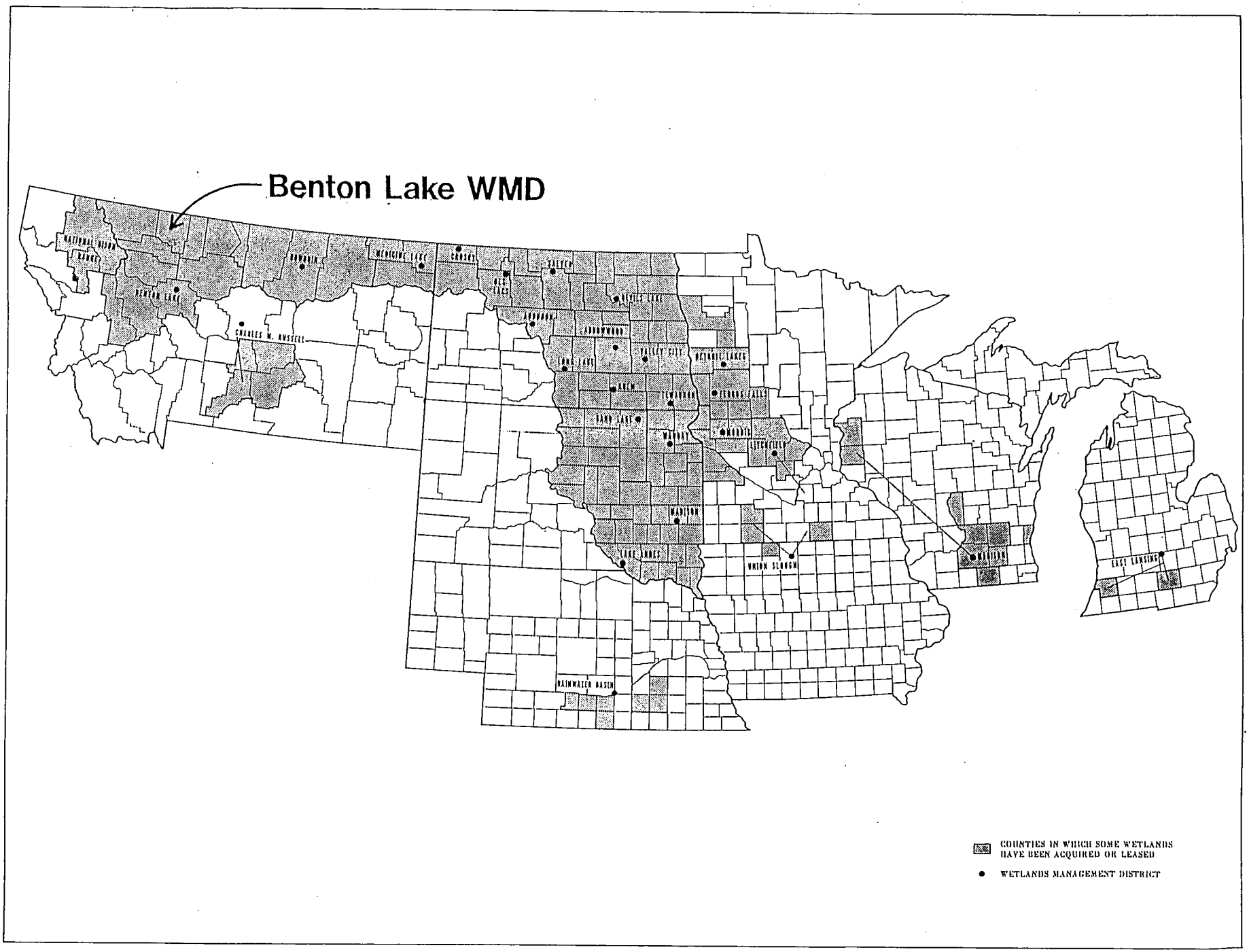
TOTAL MANAGED ACRES = 14,626.02

* An additional 1,942.48 acres of State and BLM lands are contained within WPA boundaries.
** An additional 280 acres are leased from the State of Montana (Hingham Lake WPA).

UNITED STATES
DEPARTMENT OF THE INTERIOR

WATERFOWL PRODUCTION AREAS

UNITED STATES
FISH AND WILDLIFE SERVICE



COMPILED IN THE DIVISION OF REALTY

0 100 200 300 MILES

BENTON LAKE WETLAND MANAGEMENT DISTRICT

* Benton Lake National Wildlife Refuge

▪ Waterfowl Production Areas

1.	Furnell	1,995.00 Ac	
2.	Ehli	475.24 Ac	
3.	Danbrook	327.00 Ac	
4.	Dunk	80.00 Ac	
5.	Brown	260.00 Ac	
6.	Long Lake	645.66 Ac	
7.	Blackhurst	320.12 Ac	
8.	Cemetary	108.58 Ac	
9.	Peterson	94.20 Ac	
10.	Hingham Lake	280.00 Ac	*
11.	Jarina	640.00 Ac	
12.	Savik	397.00 Ac	
13.	Sands	378.93 Ac	
14.	Brumwell	251.50 Ac	
15.	Hartelius	307.22 Ac	
16.	Big Sag	349.58 Ac	**
17.	Kingsbury Lake	3,733.69 Ac	**
18.	Schrammeck Lake	420.24 Ac	
19.	Blackfoot	1,524.60 Ac	
20.	Kleinschmidt Lake	1,120.00 Ac	
21.	Arod Lakes	797.46 Ac	

TOTAL FEE ACREAGE 14,506.02 Ac

* Leased from the State of Montana
** These WPA's contain acreage held under BLM and State ownership

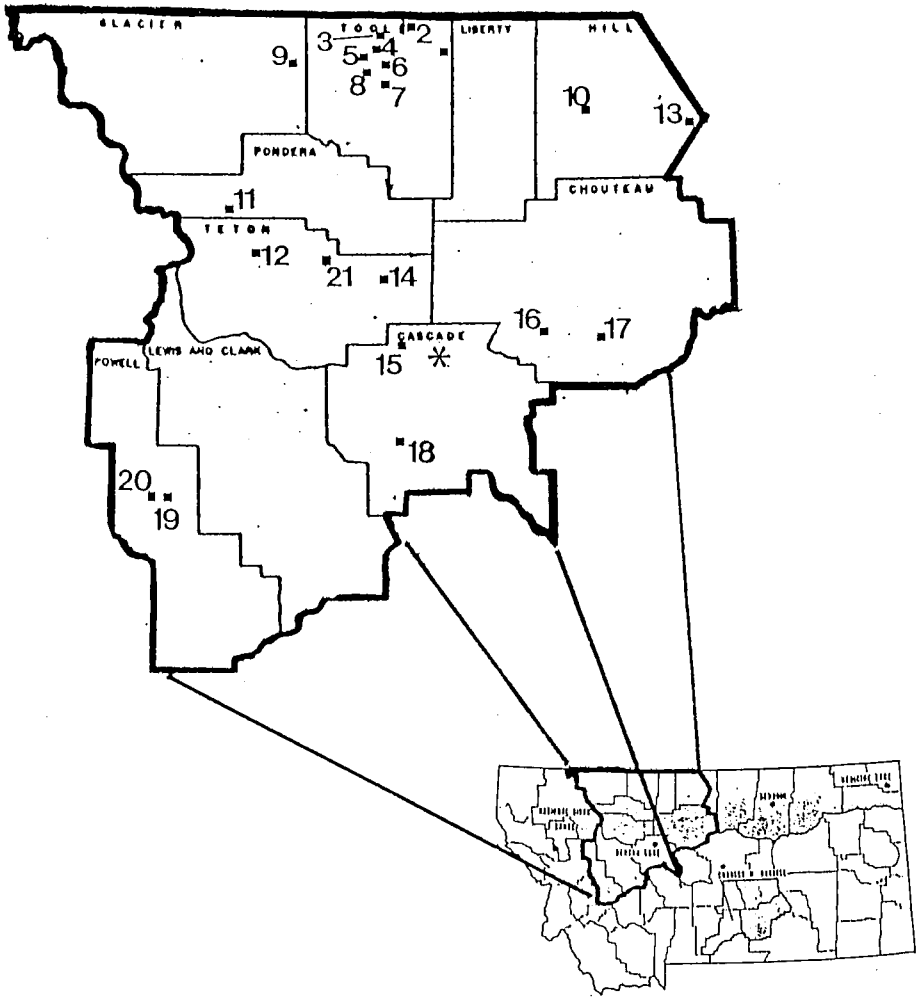


TABLE III

WETLAND EASEMENT ACRES BY COUNTY

County	Easement Tracts	Wetland Acres
Toole	55*	2,533*
Glacier	47	2,203
Liberty	9	428
Pondera	9	733
Hill	6	407
Cascade	4	78
Powell	0*	0*
Lewis & Clark	2	247
Teton	1	50
Chouteau	1	21
Totals	**134**	**6,700**

* Note: Powell and Toole County totals have been revised downward from previously reported acreage due to the conversion of wetland easement tracts to a new conservation easement program. These protected wetland acres are now reflected in Table III.

TABLE IV

GRASSLAND EASEMENT ACRES BY COUNTY

County	Easement Tracts	Grassland Acres
Powell	0*	0*
Glacier	3	3,663
Totals	3	3,663

* Note: Powell County totals have been revised from previously reported acreage due to the conversion of grassland easement tracts to a new conservation easement program. These protected grassland acres are now reflected in Table VI.

b. Rural Economic & Community Development Services Easements

Legislative changes to this program has made it increasingly difficult to protect significant trust resources on Rural Economic & Community Development Services Easements (RECDS) inventory properties. No additional RECDS easements were proposed in 1998. Several proposals from last year are still awaiting final approval pending the lease back-buy back rights of the delinquent borrower. To date, two RECDS easements have been recorded in the district (Table V).

TABLE V

RECDS EASEMENT ACRES BY COUNTY

County	Number of Tracts	Wetland Acres Protected	Grassland Acres Protected	Total Acres
Cascade	1	80	170	250
Teton	1	2	12	14
Totals	**2**	**82**	**182**	**264**

c. Conservation Easements

A comprehensive conservation easement program was developed to address residential subdivision and commercial development of important habitat in the western portion of the WMD. Under the Small Wetlands Acquisition Program (originally designed to prevent agricultural conversion of habitat in the prairie pothole region), the use of traditional wetland and grassland easements doesn't adequately deal with these new threats in western Montana. This prompted us to develop a new easement program that incorporates provisions of the wetland and grassland easement into a single document and adds additional restrictions to prohibit subdivision and development of private land for residential, commercial or industrial purposes. The majority of this work continues to focus on the Blackfoot River Valley, although the program was expanded last year to include the Rocky Mountain Front and Sweetgrass Hills.

Funding to purchase conservation easements on properties with wetlands is provided by the Migratory Bird Conservation Fund. In addition, Land and Water Conservation Funds (LWCF) are being used to protect other threatened habitats (riparian areas, intermountain grasslands, montane forests, etc.) that don't qualify for the Small Wetlands Program.

In FY 98, Congress appropriated $1,000,000 for the Western Montana LWCF Project, which includes two focus areas involving the Blackfoot Valley in the Benton Lake WMD and the Mission Valley which is administered by the National Bison Range. All of the FY 98 LWCF funding was used to purchase an easement on a large property in the Mission Valley.

It was another successful year for our conservation easement program in the district. Easements were purchased on three tracts totaling 7,317.48 acres. Two tracts (6,512 acres) were acquired with Migratory Bird ("Duck Stamp") funding while the remaining one (805 acres) was funded with LWCF carryover monies.

Two additional easements were acquired in the Blackfoot Valley in 1998. The 805 acre Murphy Ranch (Powell County 15C-1) was protected with LWCF funding and includes nearly two miles of Warren Creek, an important spawning tributary for west slope cutthroat trout. The project also involves a significant PFW effort to implement a grazing management program and remove a livestock corral from the riparian area. The second acquisition involved the 1,598 acre Fleming Ranch easement (Lewis & Clark 12C) in the upper Blackfoot near Lincoln. This tract includes a diversity of wetlands and riparian habitat that provide habitat for waterfowl, sandhill cranes and bull trout.

One additional easement was acquired with Migratory Bird funding along the Rocky Mountain Front. The 4,914.42 acre Boadle Ranch tract (Teton County 16C) lies south of Piskun Reservoir and east of the Sun River Wildlife Management Area. The project was a joint effort with the Natural Resource Conservation Service (NRCS) under their Wetland Reserve Program (WRP). NCRS acquired a 30 year WRP easement which we "piggybacked" with a perpetual conservation easement. The partnership enabled us to restore and enhance 893 wetland acres and protect an additional 4,021 acres of native prairie.

To date, conservation easements have been purchased on eighteen tracts to protect 38,078 acres in the district (Table VI).

TABLE VI

CONSERVATION EASEMENT ACRES BY COUNTY

County	Number of Tracts	Wetland Acres Protected	Grassland Acres Protected	Total Acres
Glacier	2	212	2,180	2,392
Toole	2	585	8,625	9,210
Powell	12	1,776	18,188	19,964
Teton	1	893	4,021	4,914
Lewis & Clark	1	196	1,402	1,598
Totals	**18**	**3,662**	**34,416**	**38,078**

D. PLANNING

4. Compliance with Environmental and Cultural Resource Mandates

Pesticide Use Proposals were written and approved at the field level. All required Federal, State, and Tribal permits as well as endangered species and cultural resource reviews are completed for each Partners for Wildlife project.

5. Research and Investigations

a. Benton Lake WMD Non-Game Monitoring Program

The point count transects which were established on the Furnell and Kingsbury Lake WPA's in 1995 were checked again this year. A total of 505 individuals and 36 species were detected along 47 points on five transects on the Furnell WPA in 1998. The rolling prairie interspersed with numerous shallow wetlands on this unit is typical of the glaciated prairie pothole region. Savannah sparrows were the most abundant species detected followed by Western meadowlarks and Sprague's pipits. Twenty-one Baird's sparrows, which are listed as rare by the Service in Region 6, were detected on this unit. Sixteen Baird's sparrows were detected on this unit in 1995, two in 1996 and seventeen in 1997.

A total of 419 individuals and 36 species were detected along 44 points on eight transects at the Kingsbury Lake WPA. This WPA is situated in the foothills of the Highwood Mountains with rolling terrain and steep rocky breaks. Transects on this unit were located in grassland, riparian zone and greasewood flats. Western meadowlarks were the most abundant species detected followed by Brewer's blackbirds. Only one Sprague's pipit and no Baird's sparrows were detected on this unit. The third most abundant species detected on this unit were lark and vesper sparrows.

E. ADMINISTRATION

1. Personnel

The ten county district is administered by staff at Benton Lake NWR. Management of the district is challenging, due to the small staff and logistical problems associated with managing WPA's located over 100 miles from headquarters.

A GS-6/7 biological technician position for the WMD was advertised by Office of Personnel Management in May. After the interview process was completed we offered the job to four applicants, all of whom turned it down. We did not feel that any of the remaining candidates met the qualification standards. The vacancy was readvertised on the Service "green sheet" in November. The closing date for applying was December 3. We had not received anything from Personnel by the end of the year.

For additional information on training, meetings and other personnel matters, refer to section E.1 of the refuge narrative report.

5. Funding

Funds for District operations and maintenance are shared between the refuge and WMD. Funding for the WMD was not adequate for effective management of the far flung WPAs and easements the staff is responsible for administering. The primary shortfall is the lack of funding for staff or contracts to adequately perform the very large easement monitoring burden. Proposals for additional positions have been proposed thru the Refuge Operating Needs System (RONS).

6. Safety

There were no lost time accidents associated with district field work in 1998. Johnson attended Motorboat Operator Training in Glacier National Park in June. For additional information regarding the station safety program refer to the Safety section of the refuge narrative report.

7. Technical Assistance

a. Administration

The Montana Partners for Fish and Wildlife Program (MT PFW) has been headquartered at Benton Lake NWR since 1992. The Refuge provides office space and administrative assistance for the entire MT PFW program. This administrative assistance consists of indispensable help with budget tracking, personnel paperwork, WEA processing, and a myriad of other administrative tasks.

Four significant personnel changes occurred in 1997/98. New PFW field biologist positions were established in Helena and Kalispell. **Sue McNeal** came to the Partners Program from Red Rock Lakes NWR. She is working primarily on the Rocky Mountain Front PFW Focus Area which stretches from Augusta, Montana to Glacier National Park. Sue is restoring wetland, in-stream and riparian habitat on "the Front." **Rox Rogers** moved to the Creston Fish and Wildlife Center from the National Elk Refuge. Rox will be restoring native fish habitat and riparian wetlands in the Swan River Valley and Kootenai River drainage of NW Montana. **Dean Vaughan** who has worked in the Mission Valley since 1992 was upgraded from a bio tech to a Fish and Wildlife Biologist. We also hired **Mike Redstone**, a tribal member from the Fort Peck Indian Reservation. Mike will use NAWCA monies to restore habitat on private land within the Reservation. All of these actions have strengthened our PFW program statewide.

2. Partners for Wildlife Habitat Accomplishments

The Montana PFW Program continues to use a "focus area" concept to target habitat restoration efforts. This strategy allows us to prioritize staff and funding. Various criteria are used to establish PFW focus areas. North American Waterfowl Management Plan Joint Venture Areas automatically qualify. Other focus area's designations are based on unique habitats, T&E or candidate species concentrations, threat levels, and restoration opportunities.

Benton Lake WMD has two PFW focus areas; 1) The Blackfoot River Watershed and 2) The Rocky Mountain Front. PFW Focus Areas, outside of Benton Lake, include; 1) The Centennial Valley in SW Montana, 2) The Big Hole River Valley, 3) Beaver Creek PPJV Area, 3) Northeast Montana PPJV Area, 4) Five-Valleys PPJV, 5) Swan and Kootenai River Watersheds, 6) Mission Valley, and 7) Ft. Peck Indian Reservation.

Stream channel dimension, pattern, and profile must be evaluated prior to restoration. Gold Creek historically had pools and riffles every 100 feet before loggers obliterated the step-pool habitat so logs could be easily transported to the mill. In 1998, MT PFW restored nearly three miles of pool and riffle habitat in Gold Creek using logs, root wads, and rocks.

Native fish, like west slope cutthroat trout, migrate to spawning tributaries during high flows. Undersized and improperly installed road culverts often hinder fish passage. MT PFW and MT Fish, Wildlife and Parks have begun to identify fish passage problems and are working with landowners and county road departments to remove or replace these barriers.

BEFORE

AFTER

The 1998 restoration of Kleinschmidt Creek included narrowing the creek channel, bank stablilization and the addition of woody debris. A grazing system, including off-site water, was also designed and implemented.

BEFORE

AFTER

Water conditions in the Blackfoot Valley were excellent in 1998. This drained wetland was restored in 1995 and filled to full pool level in April.

BEFORE

AFTER

Like many Montana streams, Salmon Creek was channelized for "improved" hay production and irrigation efficiency. The stream channel was restored by MT PFW in 1998 and now provides habitat for spawning bull trout and west slope cutthroat trout.

Two teams completing the wildlife test at the 1998 Montana Envirothon.
RFJ **4/98**

Dave Rosgen of Wildland Hydrology discussing stream restoration techniques in Colorado.
RFJ **8/98**

FY 1998 ACCOMPLISHMENT:

1. Wetland Habitat

Wetland restoration remains a high priority for the MT PFW Program. Livestock producers continue to request wetland projects because they provide additional forage and livestock water. Funding partners are also keenly interested in wetland restoration. Non-FWS Money for wetland projects is provided by Ducks Unlimited, Pheasants Forever, Montana Fish, Wildlife and Parks, and private landowners. We also received nearly $300,000 in North American Wetlands Conservation Act grants for habitat restoration on private lands in the Northeast Montana PPJV, Beaver Creek PPJV and Ft. Peck Indian Reservation. Table summarizes statewide wetland accomplishments for the MT PFW Program in 1998.

TABLE VII

1998 PFW Accomplishments: Wetland Habitat

Project Type	Number of Basins	Acres Impacted	Total Cost
Wetland Restoration	46	702	$87,250
Wetland Establishment	25	147	$183,750
Wetland Enhancement	23	410	$75,000
TOTALS	**94**	**1,259**	**$346,000**

* Total Cost includes contributions by Non-FWS funding partners

2. Riparian and In-stream Aquatic Habitats

We continued to make riparian and in-stream habitat restoration a priority in 1998. Landscape and watershed projects must address restoration opportunities in all habitat types, including in-stream and riparian areas. In western Montana, riparian and in-stream

restorations projects provide critical habitat for a variety of declining fish and wildlife species. Private landowners are also better informed about the values of healthy streams and riparian areas.

Benton Lake WMD has vast acreages of privately owned in-stream and riparian habitat. The District includes portions of the Rocky Mountain Front, The Blackfoot River Valley, and Upper Missouri River Watershed. These three landscapes include large rivers, "blue-ribbon" trout streams, perennial streams, spring-fed coulees, and countless intermittent creeks.

Unfortunately, many riparian and in-stream habitats are degraded. They have been overgrazed, channelized, developed, paved, de-watered, logged, and subdivided. Significant declines in native fish, migratory birds, and other species have followed.

Fortunately, the Montana PFW Program, along with other key partners, is working to restore critical riparian and in-stream habitat. We are also removing fish passage barriers, installing fish friendly irrigation structures, and enhancing in-stream flows by providing off-site tanks and wells. Our 1998 accomplishments are listed below. We were able to restore and protect 87.5 miles of riparian and in-stream habitat in 1998. **More impressively, we have restored 454.3 miles of riparian and in-stream habitat in Montana since 1995!**

TABLE VIII

1998 PFW Accomplishments: Riparian & In stream Aquatic Habitats

Project Type	Number of Sites	Miles Restored	Total Cost
Riparian Restoration	42	44.1	$263,000
In-Stream Restoration	52	43.4	$328,000
TOTALS	**94**	**87.5**	**$591,000**

* total cost includes contributions by non-FWS funding partners

a. **Special PFW Projects**

Partners for Wildlife is enormously popular in Montana. This success is due to three important features; innovation, creativity, and flexibility. As has been the case in past

years, we were presented with some unique projects in 1998. One of the newest challenges arose in the Big Hole River of SW Montana. This large river system contains one of the last viable populations of fluvial Arctic Grayling in Montana. Unfortunately, the River is also chronically de-watered. The low flow problems typically occur in late summer when ranchers need water for livestock. Landowners desperate for livestock water, divert water from the Big Hole into irrigation canals. This is a very inefficient way to deliver livestock water but landowners don't have options. The impacts to grayling are disastrous. Average flows in the Big Hole dropped to 1.9 CFS in August of 1994. These flows will not support the grayling fishery.

In 1997, Montana PFW along with MFWP and the local Conservation District began drilling off-channel wells. By the end of 1998, eight wells and 20 tanks were installed. Total cost for the wells, electric pumps, and tanks was $85,000. The project closes three large ditches adding 15-20 CFS of water to the Big Hole River. The increased flow will sustain the fishery.

b. Funding Partnerships

Funding partnerships are the foundation of the MT PFW Program. We leverage money from many sources including, other government agencies, NGO's, foundations, landowners, and corporations. Nearly every PFW project in Montana includes cost-share funds.

Partnerships often develop slowly as trust and credibility improve. The process requires patience but the rewards are obvious. Table IX summarizes the amount of non-FWS monies used for habitat projects in 1998. Leading contributors to PFW projects in Montana include: private landowners, Montana Department of Fish, Wildlife and Parks, Trout Unlimited, Ducks Unlimited, National Fish and Wildlife Foundation, and Pheasants Forever.

TABLE IX

1998 PFW FUNDING PARTNERS - MONTANA PFW PROGRAM

Group/Agency	$ Contributed
MT Department of Fish, Wildlife & Parks	$242,000
Ducks Unlimited	$ 25,000
Trout Unlimited	$101,000
Private Landowners	$ 53,000
Foundations & Grants	$ 50,000
US Department of Agriculture	$ 64,000
National Audubon Society	$ 2,000
U.S. Air Force	$ 4,000
Missouri River Flyfishers	$ 2,000
Pheasants Forever	$ 18,000
TOTAL FUNDS PROVIDED BY PARTNERS	**$561,000**

c. Conservation Compliance (FSA)

Approximately 45 staff days were spent working with the Natural Resources Conservation Service (NRCS) and Farm Services Agency (FSA) on various Farm Bill issues. Technical assistance was provided to NRCS on twenty-five Swampbuster cases and twenty wetland determinations.

Service personnel assisted NRCS in developing the statewide Wildlife Habitat Incentive Program Plan (WHIP). The WHIP Program provided about $500,000 to private landowners for habitat restoration and enhancement in 1998. Montana's WHIP priorities are native prairie enhancement, wetland restoration and in-stream habitat restoration.

Workloads related to implementation of the Wetland Reserve Program (WRP) also increased in 1998. Sixty-seven WRP sites were inspected by Service personnel. We expect that 10-15 properties will be protected by WRP easements by 1999.

Montana has over 3 million acres of CRP. These vast CRP acreages have a dramatic effect on wildlife populations. For this reason, staff from the Montana PFW Program and Benton Lake WMD are formally involved in all aspects of CRP. We serve on the USDA State Technical Committee which is a very influential organization with regard to CRP. We continue to offer a "wildlife perspective" on seed mixtures, haying and grazing, weed control, and maintenance.

8. Other Items

Revenue sharing checks for FY 1997 totaled $ 14,090 or 66 % of full entitlement, a 6.5 % decrease from last year. Payments less than 100% entitlement still far exceed personal property taxes paid by private landowners in the state. Consequently, county commissioners in the district are generally supportive of our small wetlands program and occasionally participate in cooperative projects such as road maintenance. Checks were personally delivered to all County commissioners except for the Glacier County check which was mailed.

F. HABITAT MANAGEMENT

1. General

Habitat manipulation on WPA's is used to enhance productivity of wetlands and uplands. Haying and grazing are the primary management tools. Prescribed burning is also occasionally used. WPA habitat types include approximately 3,691 acres of wetlands, 7,384 acres of native grassland, 3,041 acres of tame grasses/legumes, 220 acres of forest, and 68 acres of riparian habitat.

2. Wetlands

Snowfall west of the continental divide in the winter of 1997/1998 was below normal. The mountain snowpack was also below normal and runoff was very poor. Wetlands in the Blackfoot Valley were in fair condition at the beginning of the nesting season. Runoff east of the divide was essentially non-existent and wetland conditions were very poor. Early spring was warm and dry throughout the district. Late spring and early summer rains (May, June, July) were above normal throughout most of the WMD and wetland conditions improved considerably. Late summer through fall was warm and dry throughout most of the WMD. Wetland conditions deteriorated rapidly east of the divide in August. West of the divide fall conditions were not as bad with many wetlands still holding water at freezeup.

Wetland conditions along the Rocky Mountain front were fair. Wetlands on the Jarina WPA were holding water and the emergent cover was excellent. High water levels of the past several years had eliminated emergent vegetation from the wetlands on the unit. The lower water levels of the past two years promoted extensive bullrush growth.

The main marsh on the Schrammeck Lake WPA in Cascade County was dry on June 1 and was full on June 30th. More than six inches of rain fell locally during the month. The seasonal wetlands on the Arod Lakes WPA in Teton County had no water during the nesting season and the main lake was drawn down to very low levels by the Brady Irrigation Canal Company by late summer.

The Sands WPA in Hill County had no water until mid-summer when local rains filled about one-third of the unit. We added our fifty acre feet of water in June which does not go far in a 270 acre basin. The large marsh on the Ehli WPA in Toole County that was restored in 1993 was dry during the spring. In July, approximately half of the unit had very shallow water. The entire marsh was dry by September 1. The overall wetland conditions in the Sweetgrass Hills area were very poor. Virtually all basins were dry by mid-summer.

The wetlands on the Blackfoot WPA remain in excellent condition. Water moved through the system into July when water levels began dropping in all of the wetlands. The four basins that were restored or enhanced in 1993 have extensive emergent growth and invertebrate development. The amphipod populations are extremely high in several of the wetlands. Migratory bird use throughout the breeding season is very heavy with many

waterfowl broods using the wetlands. We have kept Pool 3 in a limited drawdown state in an effort to promote emergent growth. The response has been very slow although some cattails are beginning to appear on the margins of the pool. One of the natural oxbows on the unit held water this year for the third year in a row and was used extensively by mallards, wood ducks, and canvasbacks.

Erosion along the Blackfoot River continues to be significant on the Blackfoot WPA. Another large section of bank collapsed into the river which increases the threat to the restored wetland complex on the WPA. We hope to have Dave Rosgen look at the problem in 1999 and recommend how to deal with it.

3. Forests

The Blackfoot WPA is the only WPA in the WMD with significant forested habitat. Two hundred and twenty acres of Ponderosa pine on Marcum Mountain and 68 acres of riparian habitat (cottonwoods, aspen, willow) along the Blackfoot River are found on this unit. No active management has been conducted in these forested areas. Our current goal is to protect them from the grazing and logging activities conducted on adjacent private land. The Marcum Mountain portion of the WPA is very important elk and mule deer winter habitat. The older timber provides thermal cover and the south facing slopes in and around the timber are important feeding areas which stay relatively free of snow. Maintaining this area as winter cover is our primary management objective for Marcum Mountain.

The riparian area that was fenced on this unit in 1992 is in good condition and is used very heavily by elk and white-tailed deer. Red-osier dogwood, which is a favorite deer food, has come on very strongly since the cattle were removed. Limited fence damage occurred in the spring from fallen trees and river channel movement. This is a continuing maintenance problem that needs to be addressed each spring or we inevitably end up with trespass grazing.

4. Croplands

Sixty-two acres of cropland on the Ehli WPA in Toole County were seeded to a standard DNC mix at the end of April. In spite of dry spring conditions it appears that we were able to get a good catch. We did receive a complaint from a neighbor in December about all of the "tumbleweeds" in his fence row that came from our seeding.

5. Grasslands

Two five person Montana Conservation Corps (MCC) crews spent a week removing trees on the Kleinschmidt Lake WPA. Rocky mountain juniper, ponderosa pine, and Douglas fir have invaded the grasslands there as a result of many years of fire suppression. This is a serious problem on both the Blackfoot and Kleinschmidt Lake WPA's in the Blackfoot

Results of a chemical application on a native grass seeding that was invaded by Musk Thistle on the Blackfoot WPA.
RFJ **7/98**

Engineering Equipment Operator Brewer seeding 62 acres of cropland to a DNC mix on the Ehli WPA in Toole County with our Haybuster no-till drill.
RFJ **4/98**

Valley, as well as large areas of private land. Another MCC crew spent a week removing trees on private ground immediately south of the Kleinschmidt Lake WPA. We are hopeful that these efforts will benefit the Columbian sharp-tailed grouse. One of the few known leks in the valley is located on this private ranch adjacent to the Kleinschmidt Lake WPA.

The WMD includes 6,450 acres of native grassland. Most of this lies in the eastern portion of the district and consists mainly of western wheatgrass and green needlegrass. WPA's in the foothills and mountainous areas contain primarily western wheatgrass, bluebunch wheatgrass, and rough fescue. Our grazing management program continues to develop. We have obtained additional solar powered electric fencing materials which aid in more flexible use of grazing in habitat management. We had planned to begin a grazing program on the Furnell WPA in Toole County this year, but all of the wetlands were dry which created problems with access to water.

The Kingsbury Lake WPA in Chouteau County is another unit where we would like to use grazing in the habitat management program. Availability of water is a major problem on this unit. The Chouteau County NRCS staff is scheduled to begin a range survey on this unit as a first step in designing a grazing system.

This was the third year that we grazed the 640 acre Jarina WPA in Pondera County. This unit is native prairie with a small area of tame grass. A four pasture system was put into effect in 1996 and 403 AUM's were utilized. In 1997 a total of 113 AUM's were utilized in Pasture 2. This year 130 AUM's were utilized in Pastures 3 and 4. We hope to use one pasture each year on a rotational basis unless grassland conditions indicate that a higher level of utilization is warranted. Electric fencing is used with a solar powered charger on this unit. Two interior fences have been constructed that divide the unit into four pastures. It's quick and easy to put up or let down the high tensile wire that we use as our electric fence. We've had no problems with confinement or game animals knocking over the fence.

We continued with the grazing system that includes 160 acres of the Blackfoot WPA in Powell County. The system is designed with five separate pastures on and off the WPA. When one of the two pastures on the WPA is grazed a corresponding private pasture will be rested for the entire year.

6. Other Habitats

No replacement trees were planted in the three year old shelterbelt on the Arod Lakes WPA. The shrubs seem to be doing well and the weed free fabric is holding up well. We've ordered some buffaloberry that we'll use as replacement trees next year at Arod and two other small shrub plots that we've started on private land.

8. Haying

Haying was used as the rejuvenation tool on 198 acres of DNC on three WPAs (Table X). Haying was not permitted before July 15th in order to protect ground nesting birds.

TABLE X

1998 COOPERATIVE HAYING PROGRAM

WPA	Acres Hayed
Dunk	45
Blackhurst	100
Kingsbury Lake	53
TOTAL	**198**

DNC stands in the WMD are in good to excellent condition. Almost all of our DNC acres have been hayed at least once since 1989. Haying removes the heavy litter buildup that develops after several years of rest. Most stands have a good legume component and are vigorous and productive. We no longer require that the stands are raked since the additional amount of old material that is removed in a raking operation is very small. We require that the stand be cut as close to the ground as possible. This removes virtually all of the old dead litter.

We had planned to hay more than 100 acres on the Arod Lakes WPA in Teton County, but an early July hail storm shredded the cover and performed essentially the same operation.

9. Fire Management

No prescribed burns were conducted in the WMD in 1998. We were also fortunate to escape any wildfires.

10. Pest Control

Canada thistle, musk thistle, spotted knapweed, diffuse knapweed, Russian knapweed, small whitetop, leafy spurge and yellow toadflax are the targets of our weed control efforts. Mechanical, biological and chemical control methods are used. Fortunately, most weed infestations are small.

In 1998, a total of 62.75 acres of noxious weeds on four WPA's were treated with chemicals (Table XI). Most of the chemical use locations were on small isolated patches The one exception was a 60 acre native grass seeding on the Blackfoot WPA. We have been working for several years on a weed control effort on the 65 acre native grass seeding on this WPA where we have had continual problems. Native grasses were initially seeded into winter wheat stubble in 1992, but, a major cheatgrass infestation appeared the following year which severely impacted stand establishment. We sprayed the field out

once and reseeded it, but, the cheatgrass came back as strong as ever. We have made significant progress in cheatgrass control with two years of short duration high intensity grazing which has been effective in reducing cheatgrass coverage and seed production. This year 40 head of cattle were turned in in mid-May and remained on the field for twenty days. The field has also become heavily infested with both musk and Canada thistles. It is located immediately adjacent to Highway 200 and the interpretive overlook on the unit is right on the edge of this field. It should be an good example of a native grass restoration rather than a large thistle patch. This integration of grazing and chemicals is finally showing good effects.

TABLE XI

1998 CHEMICAL NOXIOUS WEED CONTROL

WPA	TARGET SPECIES	ACRES	CHEMICAL/ACRE
Blackfoot	Canada Thistle Musk Thistle Spotted Knapweed	60.5	2 Quarts Curtail
Blackfoot	Leafy Spurge Yellow Toadflax	1.0	1 quart Tordon/ 1quart 2,4-D
Ehli	Canada Thistle	.5	2 Quarts Curtail
Arod Lakes	Canada Thistle	.25	2 Quarts Curtail
Arod Lakes	Russian Knapweed	.25	1 quart Tordon/ 1 quart 2,4-D
Schrammeck Lake	White Top	.25	1 ounce Escort
	TOTAL ACRES	**62.75**	

Rhinocyllus conicus, a musk thistle seed head weevil, is present in the district and infests more than 95 percent of the musk thistle flowers. Unfortunately, enough viable seed is still produced to result in an extensive infestation of this species.

No additional releases of biological control agents were made on the Blackfoot WPA in 1998. Agapeta zoegana, a root moth, were released on the unit in 1993, 1994, 1995, and 1997. Two moths, Urophora affinis and Urophora quadrifasciata, that attack spotted knapweed flowers are present on the unit and releases of Cyphocleonus achates, a root weevil that also attacks spotted knapweed were made in 1994 and 1995. We need to document the success or failure of the Agapeta and Cyphocleonus releases and we plan on initiating intensive field searches in the late summer of 1998.

Brachypterolus pulicarius, an ovary feeding beetle, and Calophasia lunula, a defoliating moth, were released on the Blackfoot WPA as biological control agents for yellow toadflax in 1995. Dr. Bob Noweirski from Montana State University has started to establish insectiaries for these two species at various locations in the Blackfoot Valley. Additional releases of these insects were made in the valley this year. New toadflax infestations continue to appear all over the valley in native and tame grasslands. This particular noxious weed is becoming a very serous problem. Chemical control of toadflax is difficult, especially in the sagebrush community where significant damage can occur to the sagebrush plants. Several large patches of toadflax on the Blackfoot WPA appeared to have been significantly impacted by these insects in 1998. Plant density was significantly reduced and the plants that were present were noticeably smaller and less vigorous.

11. Water Rights

Routine monitoring and reporting of water rights was completed in the annual water use report.

13. WPA Easement Monitoring

Easement flights were completed in late April. No new violations were found.

G. WILDLIFE

Specific information on district wildlife populations is limited, due to its size and our limited staffing. Wildlife surveys are usually done incidental to other WPA projects. With an average driving distance of 100 miles from headquarters to most WPA's, collecting accurate and timely biological information is difficult. Two point count transects on the Furnell WPA and Kingsbury Lake WPA (see D.5.) allow us to at least monitor passerine population trends on these two units.

1. Wildlife Diversity

The Benton Lake WMD stretches from the Rocky Mountains to the short grass prairie of the northern Great Plains. A wide diversity of wildlife habitat occurs in this 25,000 square mile portion of the state. Almost all species present in this part of Montana can be found on WPAs or Service easements at some time of the year.

2. Endangered and Threatened Species

Interior Secretary Bruce Babbitt visited the Blackfoot Valley on June 5th to announce the listing of the Bull Trout as a Threatened Species. It's truly amazing how much work goes on behind the scenes to put together one of these visits and how often plans change right up to the last minute. He also had breakfast with some members of the Blackfoot Challenge.

Seventeen active bald eagle nests have now been documented in the Blackfoot River watershed including one located approximately two miles east of the Blackfoot WPA. Two new active nests were found in 1998, one on Monture Creek and one on Douglas Creek. The nest that was built in 1995 on Wigeon Marsh, a 42 acre wetland that was restored by the PFW program in 1993, was active again this year. This nest was active for the first time in 1996. The nesting effort was unsuccessful in 1996 and 1997 and was also unsuccessful this year. An adult eagle was shot within one mile of this nest in the early summer but we are uncertain if it was one of the pair from this nest.

There were no confirmed sightings of grizzly bears on the Jarina WPA in Pondera County however, a large male and a sow with cubs were seen on the adjacent neighbor's land during the summer. Bear sightings were up substantially along the Rocky Front in1998. Bears moved out on the prairie much farther to the east than they have been in many years. During the Montana Big Game Season the Department of Fish, Wildlife and Parks issued a warning to hunters about Grizzlies in many of the drainages coming off the Rocky Mountain Front. During the last half of October a boar grizzly was sighted several times on the Kleinschmidt Lake WPA in Powell County feeding on ground squirrels. FWP also issued warnings to big game hunters along the Blackfoot River about the Grizzly bears in the area.

The site where Interior Secretary Babbitt announced the listing of the Bull Trout in June.
RFJ **6/98**

A warning to hunters on the Aunt Molly Game Management Area along the Blackfoot River. This is a popular area for archery hunting deer and elk.
RFJ **10/98**

A very unhappy and very large prairie rattlesnake on the Big Sag WPA in Chouteau County. Rattlesnakes are very common in the eastern part of the WMD.
RFJ 10/98

A brand new antelope fawn near the Kingsbury Lake WPA in Chouteau County. This little guy was lying in the middle of the road before we convinced him to move.
RFJ 5/98

Gray wolf populations continue to increase in the western and southern portions of the WMD. Wolves were sighted in the Blackfoot Valley and on the Blackfeet Indian Reservation along the Rocky Mountain Front. There were also several sightings in southern Lewis & Clark County but none were observed or known to be present on WPAs.

3. Waterfowl

Waterfowl habitat is found in three distinct regions of the district. Most of the WPA's are located in the intensively farmed portion of Montana's Hi-Line referred to as the Golden Triangle. The upland habitat on these units is primarily seeded tame grasses and legumes. The Furnell WPA is a 2,000 acre unit that lies at a higher elevation in the Sweetgrass Hills along the Canadian border and is characterized by rolling glaciated prairie similar to the Coteau of North Dakota. The upland habitat on this unit is almost entirely native prairie. The western portion of the district includes broad mountain valleys containing glaciated wetland complexes and extensive riparian habitat and native sagebrush/grassland.

No nest searches were conducted anywhere in the WMD this year. Water conditions were very poor during the early part of the nesting season and although conditions did improve later in the year pair populations remained quite low and we did not feel that we would be able to locate a significant number of nests.

Several pairs of trumpeter swans summer and a few nest in the Augusta area of Teton and Lewis and Clark Counties. We placed ten nesting platforms for trumpeters on small wetlands in the Augusta area in 1996. Swan have not yet used any of the platforms, but the local goose population certainly has taken a liking to them. We will continue to maintain them and hope that eventually one of the swan pairs will utilize the structures. The structures have been placed in secure locations which provide undisturbed nesting sites. There is a history of illegal shooting of nesting trumpeters in this area which is one of the primary reasons we chose to build the structures and place them in secure areas.

Canada geese continue to do extremely well throughout the WMD. Missouri River islands provide excellent nesting habitat as do many of the stock ponds and dugouts in the district. The islands on the State land adjacent to the Arod Lakes WPA have numerous nesting pairs and one successful goose nest was found in the DNC on the WPA approximately 300 yards from water.

It was a very poor duck year in the WMD. Broods were very rare due to the extremely poor water conditions east of the divide. West of the divide conditions were somewhat better and there were broods present on the Blackfoot and Kleinschmidt Lake WPA's as well as throughout the Blackfoot Valley.

Two snow geese were present on the Arod Lakes WPA on June 15th.

Cow Elk using the Jarina WPA along the Rocky Mountain front in Pondera County.
RFJ **5/98**

Canada Goose nest on the Jarina WPA.
RFJ **5/98**

4. Marsh and Water Birds

A diversity of marsh and water birds are found throughout the district. Sightings on WPA's this year included sandhill cranes, eared grebes, American coots, black-crowned night herons, great blue herons, white pelicans, double-crested cormorants, red-necked grebes, pied-billed grebes, common loons and western grebes.

Pied-billed, horned, eared and red-necked grebes nest on WPA's in the district. A pair of cranes and a colt were seen on the Schrammeck Lake WPA on August 28th. A crane pair was seen on the unit regularly earlier in the summer, even when the unit was dry, but this was the first sighting of a colt.

5. Shorebirds, Gulls, Terns and Allied Species

Poor wetland conditions provided limited habitat for shorebirds in the WMD east of the Continental Divide in 1998. Conditions were somewhat better in the Blackfoot Valley. Species observed on WPA's included American avocets, marbled godwits, willets, upland sandpipers, common snipe, killdeer, Wilson's phalaropes, red-necked phalaropes, Bonaparte's gulls, ring-billed gulls, California gulls, Franklin's gulls, long-billed curlews, black terns, short-billed dowitchers, common terns, soras, and spotted sandpipers. Black tern nesting colonies were present on the Blackfoot and Kleinschmidt Lake WPA's, but no formal surveys were conducted.

6. Raptors

Raptor's observed on WPA's during the year included golden eagles, bald eagles, prairie falcons, peregrine falcons, red-tailed hawks, Cooper's hawks, rough-legged hawks, American kestrels, ospreys, northern harriers, Swainson's hawks, great horned owls, short-eared owls, burrowing owls, and ferruginous hawks.

Burrowing owls continue to use the prairie dog town on the Kingsbury Lake WPA as a breeding site. Five were seen in the prairie dog town on the Big Sag WPA in early October.

7. Other Migratory Birds

The Shonkin mourning dove survey route in Chouteau County was completed this year. Thirty-three doves were heard, and four were seen. In 1997, 21 were heard and 11 seen. The Breeding Bird Survey for the Highwood route was completed this year by volunteer Karen Stutzman. This 25 mile loop is located 20 miles northeast of Great Falls and

contains 50 stops. Twenty-one singing male Baird's sparrows were heard on the Furnell WPA in 1998. Seventeen males were heard on this unit in 1997, two in 1996 and 16 in 1995.

8. Game Mammals

Ten species of big game mammals occur in the district including white-tailed deer, mule deer, elk, black bear, grizzly bear, antelope, moose, mountain lion, bighorn sheep, and mountain goats. Bighorn sheep and mountain goats are the only two species that have not been observed on WPA's. No specific surveys are conducted for big game.

White-tail and mule deer populations came through the winter of 97/98 in exceptional condition. Snowpack east of the divide was almost non-existent and west of the divide snow cover was well below normal. The fawn crop was outstanding. Whitetail numbers have recovered amazingly well from the very hard winter of 96/97 when losses in some areas west of the divide approached 40 percent. In some areas of the WMD, notably the Highwood Mountains, mule deer populations are doing very well. West of the divide, mule deer are not doing well and restrictive harvest regulations have been implemented in southwest Montana. Hunters there must choose one of eight SW Montana areas to hunt mule deer or they may choose the remainder of the State.

Pronghorn antelope are regularly seen on the Kingsbury Lake WPA in Chouteau County. During the fall of 1998 a herd of more than 100 animals was present on the unit. Antelope also use the Furnell WPA in eastern Toole County on a regular basis. Several other Toole County WPA's, east of Sweetgrass, also receive occasional antelope use. Antelope numbers are slowly increasing in this area. Over-the-counter doe/fawn hunting licences are no longer available. These tags were very popular and resulted in a very high harvest for a number of years. Antelope populations were significantly reduced almost to the point of being wiped out in some areas.

Elk have been observed on seven WPA's in the past several years. Elk are common on the Jarina WPA throughout the year. Eighteen cows were seen on this unit on May 6th. The Blackfoot and Kleinschmidt Lake WPA's also receive regular elk use. A herd of more than 100 animals was on the Kleinschmidt unit in mid-September. The Blackfoot unit provides important elk wintering habitat on the south facing slopes of Marcum Mountain which stay relatively snow free. Elk also use the native grass seedings on the unit in the winter with groups of up to 100 animals being common. Long Lake WPA in Toole County provides important wintering habitat for a large herd of elk as well as numerous white-tailed deer. The large blocks of CRP found in this area are attractive to both deer and elk.

Black bears, bobcats, mountain lions, and an occasional moose have been reported on the Blackfoot and Kleinschmidt Lake WPA's by private landowners in the area.

10. Other Resident Wildlife

Ruffed grouse, blue grouse, spruce grouse, and Merriam's wild turkey are also found in the WMD. In the foothills of the Highwood Mountains, it's possible to hunt partridge, pheasants, ruffed grouse, sharp-tailed grouse, blue grouse, and spruce grouse in the same day on the same ranch. All of these species, with the exception of wild turkey's have been seen on WPA's.

Gray partridge and ring-necked pheasants have benefitted greatly from over 800,000 acres of cropland enrolled in CRP in district counties east of the Rocky Mountains. Sharp-tailed grouse have also increased significantly. Ring-necked pheasant and gray partridge numbers in 1998 were spotty throughout the eastern portion of the WMD. Dry conditions persisted throughout most of the WMD through the middle of May and it looked like we were set up for an excellent breeding season. Heavy rains arrived in the eastern half of the WMD around the 1st of June and continued through much of the month. Cold and wet conditions dominated the period when most pheasant nests were hatching in June which resulted in low chick survival. There appeared to be a strong renesting effort as very young birds were observed in many areas on the opening day of pheasant season. The Brady-Conrad area of Teton and Pondera Counties continued to provide excellent upland game bird hunting. Several hail storms moved through this area during the summer and had a major impact on pheasant populations. Several large blocks of CRP near Arod Lakes WPA that were seeded in 1998 and were exceptional pheasant cover were mowed in late November and December for "weed control". Unfortunately, this was tall, thick cover with lots of volunteer grain for food. The concern that resulted in widespread mowing was that Kochia plants would blow onto neighboring farms and clog up fences and tree belts. This did happen in some areas, but in this area the Kochia plants were widely scattered and if any "weed control" at all was necessary, spot mowing would have done the job instead of mowing entire large blocks. Pheasant numbers in Choteau County, in the eastern part of the WMD, were up in 1998 as compared to 1997.
Sharp-tailed grouse numbers remained at high levels in the WMD in 1998, especially along the Rocky Mountain Front, the Sweetgrass Hills, and northern Hill County. The main lek on the Furnell WPA had 39 birds on it in 1998 compared to 35 in 1997.

Coyotes, red fox, raccoon, badger, bobcats, striped skunks, mink, long-tailed weasel, muskrats, beaver, Columbian and Richardson's ground squirrels, prairie rattlesnakes, bull snakes, garter snakes, racers, and black-tailed prairie dogs are also found on WPA's in the district. Short-horned lizards were observed in two areas on Kingsbury Lake WPA in Chouteau County in 1998.

16. Marking and Banding

No pelican banding was conducted on the Arod Lakes WPA in 1998. Production appeared to be normal with some mortality of young birds during a severe hail storm in early July.

H. PUBLIC USE

1. General

A variety of wildlife oriented recreation, including birdwatching, hiking, photography, fishing, hunting and trapping in accordance with state regulations takes place on Waterfowl Production Areas. The units are open year round for these activities. Travel on WPA's is limited to foot or horseback only and overnight camping and fires are prohibited on all units except the Arod Lakes unit in Teton County where camping is allowed on a small campground that was in use when we purchased the unit. Vandalism on the Arod Lakes unit this year included using the pit toilet for target practice and burning up an entire picnic table in the middle of the access road that we had just graveled to allow easier access during rainy weather. The only thing left of the picnic table was all the nuts and bolts that held it together.

It's difficult to effectively monitor public use on the WPA's in the district. Many of the units are over 100 miles from headquarters and we just don't get to them as often as we should. We concentrate our efforts on the units that receive the most public use. The primary public use activity is hunting and the number of folks using a particular unit can be very high during the peak of the hunting season.

6. Interpretive Exhibits/Demonstrations

The interpretive overlook and parking area on the Blackfoot WPA continued to receive significant use. More than 1000 visits were recorded on the traffic counter. This overlook is on Highway 200, the main route from Great Falls to Missoula and it provides a rest stop and allows folks to see a wide variety of wildlife. Duck and goose broods, sandhill cranes, deer, elk, eagles, ospreys, and a wide variety of passerines are present on the unit. Black terns have established a nesting colony on the unit which provides additional viewing opportunities for birders. Bluebird boxes have been placed on power poles along the highway ROW and they have been occupied by mountain bluebirds, western bluebirds, and tree swallows which all provide excellent viewing opportunities. Unfortunately, some "sportsman" decided that the WPA sign at the interpretive overlook needed some modification so he blew several holes in the head of the canvasback which totally ruined the sign.

8. Hunting

Upland game hunting accounts for most of the WPA visits in the eastern part of the WMD during the fall season. Gray partridge and pheasants are common on these units and attract a great deal of hunter interest. Sharp-tailed grouse are also common on several units and also attract a great deal of hunter interest.

Pheasant hunting on the Arod Lakes WPA in Teton County was not quite as good as it had been in the past. Wet June weather and a major hail storm in July certainly took its toll of young birds. Opening day was cold and wet and very few parties shot limits of birds. Forty-five vehicles were present on the unit at sunrise on opening day, but by noon almost everyone had left. There are always a few parties on the unit every day during the season because it is one of the few public areas where folks can hunt. The large blocks of CRP that surround this unit are posted with very limited hunting opportunities for the general public. The landowner immediately adjacent to the south boundary of the unit runs a fee shooting operation.

A special youth waterfowl hunt was held on September 26, the Saturday before the regular waterfowl season opened. The same party that hunted on the Arod Lake unit in 1997 hunted again and it appeared that they had another good hunt. We hope that more young folks will take advantage of this opportunity.

Waterfowl hunting pressure on the Blackfoot WPA was similar to 1997. Nine vehicles were present on the unit on opening day and by noon almost everyone had left. This seems to be the general pattern on this unit. There are always a few birds bagged, but overall hunter success is low. Two individuals were on the unit at 9:30 PM on the evening before the waterfowl season opened. They were both carrying shotguns and lights and indicated that they had seen some bear sign and were afraid to take their decoys out unless they were armed. No citations were written, but they were shown the error of their ways in a rather lengthy lecture.

The Kingsbury Lake WPA offered both big game and upland bird hunting opportunities in 1998. Mule deer and antelope use the unit regularly and provide walk-in opportunity for those who are so inclined. Sharp-tailed grouse hunting can be excellent, but early season hunters need to exercise caution, especially for their dogs, with numerous rattlesnakes in the area. Deer and antelope numbers appeared to be similar to 1997. We did not hear of any large mule deer bucks using the unit this year.

Schrammeck Lake, Blackfoot and Furnell WPA's also offer good hunting for mule and white-tailed deer. Whitetail numbers in the Sweetgrass Hills area of Toole County were up in 1998 and mule deer numbers appeared to be stable. Antelope numbers appear to be increasing in the area as a result of the elimination of doe/fawn licenses. There are limited elk hunting opportunities on the Furnell WPA. Elk hunting in the Sweetgrass Hills is by permit only and each year we hear about deer hunters that did not have an elk permit seeing large bulls on the WPA.

Extensive private acreage in the Sweetgrass Hills has been placed in the block management program. Hunters from around the country are discovering the hunting opportunities that exist in the area. The area was very dry last fall and that fact coupled with the huge number of big game hunters attracted to the Block Management Areas prompted many of the large ranches not in the Block Management Program to close their land to hunting. They are tired of dealing with the constant flow of hunters and the problems that inevitably arise.

Deer and elk hunting in the Blackfoot Valley was a mixed bag in 1998. Deer hunting improved over 1997. Deer were more numerous with lots of small bucks and the lack of a heavy snow cover made access much easier. It will be a couple of years before all those small bucks turn into trophy class animals and the composition of the deer herd becomes similar to what the herd was before the extremely hard winter of 96/97. The future looks bright with most does having at least one fawn and many with two. Elk hunting proved to be somewhat more of a challenge. Mild weather throughout most of the season kept most elk up in the "high country" where they were not accessible to most hunters.

No biological data relative to harvests is collected in the WMD. The Montana Department of Fish, Wildlife and Parks runs check stations to collect biological information at several locations in the WMD. These stations have been run for many years and the there is a solid data base of biological information available.

Montana has a block management program that provides incentives for private landowners to provide public hunting on their lands. The program is funded through the sale of variably priced deer and elk licenses available to outfitter-sponsored nonresidents. The fee for these licenses is set to limit demand and thus guarantee licenses for those who pay the variable price. Landowners who enroll in the program are eligible for a number of incentives, including a basic impact payment of $6/hunter/day, a length of season impact payment of $2/hunter/day when no hunting-season restrictions are placed on hunting access, a species/gender impact payment of $2/hunter/day when no harvest restrictions are placed on the species or sex of animals hunted, and an access corridor payment of $3/hunter/day which can be earned by landowners who allow no hunting, but who provide access corridors to isolated public lands. The landowner receives a basic enrollment payment of $500 and can collect a maximum of $8000 per year from this program. This is an extremely popular program with landowners and sportsmen alike. Some hunters are beginning to complain about heavily used block management areas where game becomes very scarce after the first week or so of the season. Some sort of limit on the number of hunters may make for a higher quality experience.

9. Fishing

The Blackfoot WPA provides the only cold water fishing opportunities in the WMD. A small stretch of the river winds through the Blackfoot WPA. Several species of trout are present in the river, including bull trout and west slope cutthroats. The upper reaches of the river continue to recover from the effects of the washed out tailings pond at the Mike Horse Dam. This dam washed out in 1985 and dumped untreated mine tailings into the Blackfoot River with devastating effects on the fishery.

Spring runoff in the Blackfoot Valley was below normal in 1998 and we did not experience the severe erosion that occurred in the spring of 1997 after the record snowfalls of 1996/97. We are still concerned with the riverbank erosion on the Blackfoot River where it runs through the Blackfoot WPA. A large restored wetland complex is in danger of washing out if the riverbank erosion continues. Dave Rosgen is scheduled to teach a

course in the Blackfoot Valley in July of 1999 and we hope he will look at the river and make some recommendations on how we can solve the problem.

Arod Lakes WPA, west of Brady in Teton County, provides the only warm water fishing opportunity in the WMD. Northern pike and yellow perch can be found in the lake with northerns up to 10 pounds being caught. The main lake is a storage reservoir for the Brady Irrigation Canal Company and the Company controls water levels in the lake. Middle and Round Lakes are also on the unit and are connected to the main lake by the irrigation canal. Both of these lakes are also very popular fishing sites especially ice fishing. There is some interest in spring and summer fishing on the unit, but the water levels can fluctuate drastically, depending on the level of irrigation. Extensive weed growth during the summer makes fishing extremely difficult. Ice fishing on the unit was excellent through February and also during late November and early December. Numerous Northern Pike up to six pounds were caught and a few cagy anglers even managed to find a few good sized perch. The water levels in the main lake were drawn down to extremely low levels during the summer which made fishing very difficult. Access to the lake is almost impossible with low water levels and the algae and weed growth make fishing difficult.

10. Trapping

Trapping of nine species of furbearers in the WMD including marten, otter, muskrat, fisher, mink, bobcat, lynx, wolverine and beaver are governed by state regulations. Trapping is restricted to Montana residents only. There are no restrictions on trapping predators such as coyotes, red fox, badger, weasels, and skunks.

Arod Lakes WPA has a serious raccoon and skunk problem. We have tried to find someone who would be willing to trap on the unit, but we can't seem to generate any interest. Nest success would certainly benefit with the removal of at least a few of these critters.

15. Off-Road Vehicling

Vehicle trespass is a problem on WPA's, especially during the big game hunting season. We do our best to keep the units well signed and gates closed and locked, but we still end up with some folks that are determined to drive all over the place. It's also a problem on private ground and it seems to get worse every year.

17. Law Enforcement

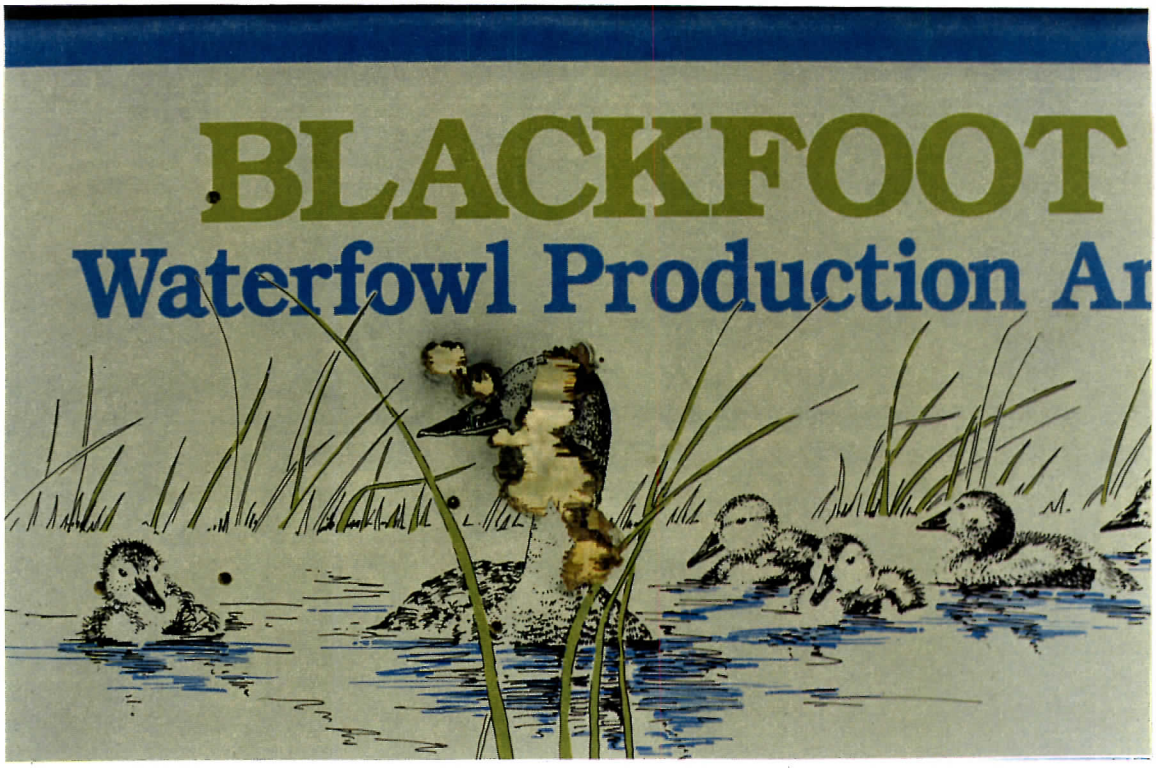
Law enforcement in a district the size of Benton Lake is difficult, at best. Travel time to many of the units is a four hour round trip. The main thrust of our law enforcement efforts occur during the hunting season.

Johnson worked the Blackfoot WPA area on the opener of waterfowl season. Nine vehicles were present on the unit. Blue skies, no wind and warm temperatures greeted the waterfowl hunters and few birds were harvested.

Johnson worked the Arod Lakes WPA area on the opening weekend of pheasant season. Hunting pressure was up substantially from 1997. There were 45 vehicles on the unit at sunrise as compared to 25 in 1997. Weather conditions were cold and wet and the number of birds were down substantially. This was the first year that the non-toxic shot requirement for upland bird hunting on WPA's went into effect and we expected some problems. On the Arod Lakes Unit more than fifty hunters were checked and all were in compliance with the non-toxic shot requirement. One NOV for possession of lead shot was written on the Hartelius WPA.

Assistance was provided to Montana game wardens with several check stations including the following: at Manchester on I-15 north of Great Falls on October 11, at Sieben Flats on I-15 south of Great Falls on October 18 and at Rogers Pass on November 1. Citations were written for take hen pheasant, failure to leave evidence of sex on a pheasant, failure to leave evidence of species and sex on waterfowl, exceed possession limit of pheasants, failure to validate a tag, and failure to stop at a check station. The Upland Game Bird regulations changed in Montana this year and all hunters were required to leave evidence of sex (a leg) on all pheasants until they reach their primary residence. This resulted in many more violation notices being written since the compliance rate with this regulation was slightly more than 50 percent. Their were more than a few very unhappy hunters that went home without a lot of pheasants.

Snow Geese arrived at Freezeout Lake Game Management Area around the middle of November and it was quite a spectacle. Unfortunately, some of the hunters were also quite a spectacle. One case which involved take and attempt to take a swan without a state permit, unplugged shotgun and shooting after hours, was turned over to state wardens. A second case involving the take of a dowitcher was also turned over to the State. Wanton waste can be a problem when the snow geese are present on Freezeout in large numbers. The flocks are high and most hunters are pass shooting birds that are at extreme ranges. Every now and then somebody hits one and it begins a slow sail off into the cattails with 50 people shooting at it. The bird ends up in the middle of the marsh and nobody has the ability to retrieve it.



Vandalism on the Blackfoot WPA unit sign. Someone fired several shotgun rounds at point blank range.
RFJ 4/98

A CRP field in Teton County that was mowed in December for weed control. This one year old stand provided exceptional habitat before it was cut.
RFJ 12/98

I. EQUIPMENT AND FACILITIES

1. New Construction

Large unit identification signs were installed on Savik, Schrammeck Lake, Furnell, Kingsbury Lake and Hartelius WPA's.

2. Rehabilitation

Routine fence maintenance was completed on the Jarina and Blackfoot WPA's. Snow and big game damage occurs every winter on these units.

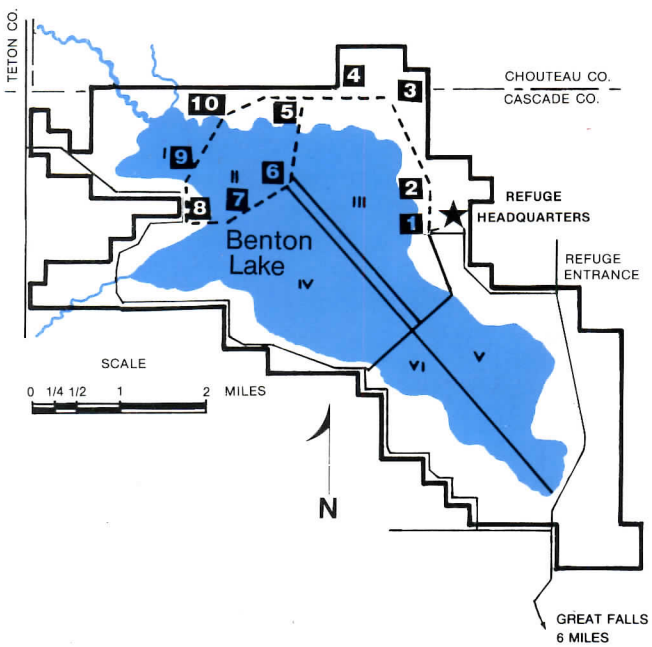
3. Major Maintenance

Fence contractor Lennie Proctor completed work on 2.6 miles of fence removal and construction on the Kingsbury Lake WPA in Chouteau County and 3.1 miles of fence removal and construction on the Big Sag WPA in Chouteau County. This project was started in 1995 by another contractor who defaulted on the work. After over a year of delay the contract was reissued in late1997 to Mr. Proctor.

A major road rehabilitation project was completed on the Arod Lakes WPA in Teton County. Approximately one mile of the main access road was regraveled and sections of the seasonal road that allows access to several fishing lakes was also graveled. The main access road had been relocated from the edge of the marsh to an upland site and all of the available gravel had been moved by a scraper to the new road location. The gravel was thin in many spots which resulted in deep muddy ruts and difficult access. The road has been significantly improved with the addition of six inches of good pit run gravel. This was a cooperative project between the Service, the Montana Department of Fish, Wildlife and Parks, and the Teton County Road Department.

AUTO TOUR ROUTE

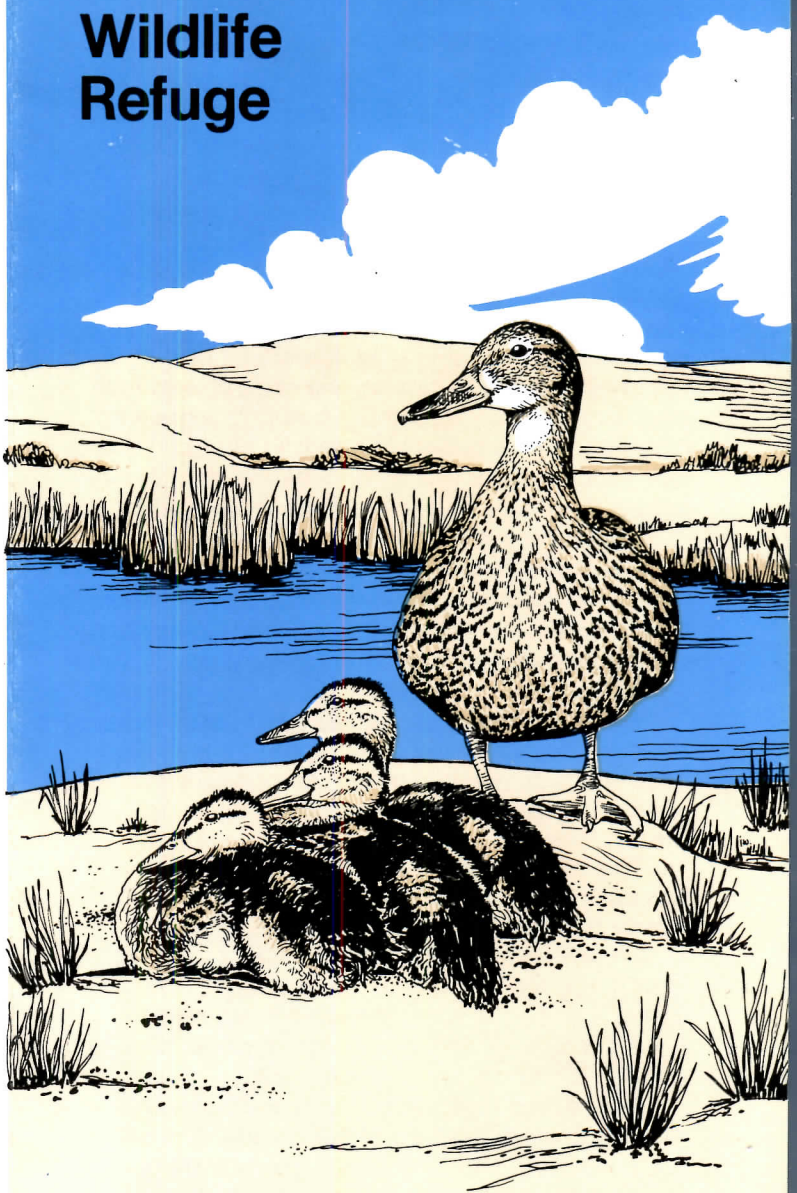
LENGTH:	9 miles
TIME:	About 1 - 1½ hours
OPEN:	Year around (road may be closed by snow in winter).
HOURS:	Daylight hours only



U.S. FISH AND WILDLIFE SERVICE
Department of the Interior

REPRINT AUGUST 1994

Prairie Marsh Wildlife Drive BENTON LAKE National Wildlife Refuge



BLACK EAGLE, MONTANA

A HILL WITH A VIEW

This is a good place to get a mallard's eye view of Benton Lake. From here, you can see how the old glacial lake bed has been subdivided by dikes into eight marsh impoundments. Control structures allow for the diversion of water into these units. Benton Lake is about 6½ miles long and varies from one to 3½ miles wide.

During migration up to 150,000 ducks, 6,000 tundra swan, 40,000 snow geese and 2,500 Canada geese have been observed on these marsh units. These concentrations often attract endangered species such as bald eagles and peregrine falcons which feed primarily on those ducks they can catch.

MARSH UNIT I

This marsh, on your left, has all the elements of a classic duck marsh. Its shallow waters teem with microscopic animal life. Plant growth is profuse above and below the water's surface. Graceful stands of bulrush and cattail are broken up in irregular fashion by expanses of open water. Ducks definitely take to Marsh Unit I.

Yet, hundreds of other wildlife species make this and other Refuge marshes their home. Up to 25,000 pairs of Franklin's gulls, several black-crowned night herons, and white-faced ibis, nest in the heavy growths of cattail and bulrush. Colonial nesting eared grebes, gather marsh plants to form floating nests. Muskrats, mink, waterfowl, great blue herons, marsh wrens, sora rails, and marsh hawks, are among those wild creatures that also inhabit Marsh Unit I.

PRECIOUS WATER

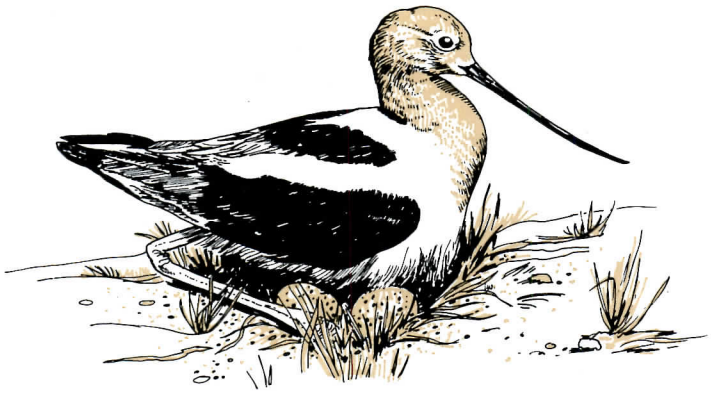
Lake Creek enters the Refuge just west of here. Prior to 1964 Benton Lake was dependent solely on natural runoff in the Lake Creek Drainage. Often too little water was received to last throughout the summer resulting in poor conditions for waterfowl during critical periods of brood rearing and migration.

A supplemental water source was obtained in 1957 from the Bureau of Reclamation in the form of return irrigation flows in Muddy Creek from the Greenfields Irrigation District. A Refuge pumping station on Muddy Creek and the associated delivery system were developed by the Fish and Wildlife Service and now provides water annually to Benton Lake. It is now possible to maintain optimum marsh conditions even in dry years.

The quality of Benton Lake's water is a continuing concern. Excessive amounts of salt, nutrients and toxic elements such as selenium, nickel, cadmium, and arsenic and pesticides pose a threat to the long-term productivity of Refuge marshes. Two known sources of these contaminants are return irrigation flows and saline seeps. Saline seeps are low volume springs caused by the fallow-cropping land use. The Refuge continues to monitor this situation and study possible solutions to the problem.

We hope you enjoyed your drive. Two-way traffic resumes ahead, so be careful and come back to visit again.

The U.S. Fish and Wildlife Service seeks to afford persons with disabilities full accessibility or reasonable accommodation. Contact Refuge Headquarters for information or to address accessibility problems. For the hearing impaired, use your State Relay System for the Deaf.



American avocet on nest.

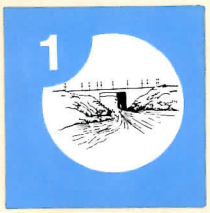
Welcome to the Prairie Marsh Wildlife Drive, a winding gravel road that will bring you in close contact with wildlife and their habitats. Remember, success in seeing wildlife depends on observational skills, timing, the season, and just pure luck. Skill is something that will come with experience. The timing of a visit is critical. Try and arrive early or late in the day when wildlife is most active. You'll see and photograph more wildlife.

Contact the manager in advance of your visit to learn at what season or seasons waterfowl and other wildlife are most commonly seen. Advance planning will increase your chances of observing wildlife and make you less dependent on sheer luck.

Ten numbered signs along the drive correspond to the numbered paragraphs in the leaflet. The information will increase your understanding of the Refuge and make your visit more pleasurable.

The drive begins at the information kiosk and has both one-way and two-way traffic. Please drive slowly being careful not to unduly disturb wildlife or fellow visitors. Wildlife will remain closer to the road if you remain in your car. Stopping is allowed where the road is wide enough for vehicles to pass. Stops 6, 8, and 10, provide opportunities to get out of the car and stretch.

Be advised that certain activites are not permitted because they are either unsafe, unlawful, or not consistent with the refuge goals. Prohibited activites include camping, littering, driving off roadways and damaging or collecting plant or animal life.



MANIPULATING NATURE

Benton Lake was established as a refuge and breeding ground for birds. To accomplish this mission, work has centered on the development of marshlands and relatively safe nesting areas. Eight marshy areas have been constructed by an intricate diking system. Within each unit, a wet meadow, marsh and open water are available; ideal habitat for breeding ducks.

Because most ducks nest on the ground, eggs and hens are vulnerable to predation by skunks, raccoons and foxes. To separate eggs from the eggeaters, several nesting islands have been built in the marshes. By encircling the islands, the marshy waters provide a barrier that bars most predators from reaching the nesting birds. Some predator control is also undertaken. The two acre island before you will likely have several Canada goose and up to 100 duck nests as island vegetation improves. Three islands, including this one, were constructed by Ducks Unlimited, a private conservation group.

BIRDS OF THE OPEN PRAIRIE

The summer air is filled with songs of meadowlark, chestnut-collared longspur and savannah sparrow. These songsters share their prairie domain with upland sandpipers, horned larks and prairie sparrows such as the vesper, lark, grasshopper, and an occasional Baird's sparrow. All of these species are dependent on the remaining stands of native shortgrass prairie found and protected on the Refuge.

Native grasslands are generally rested to provide undisturbed cover for wildlife. This rest needs to be interrupted occasionally by manipulations such as prescribed burning and controlled grazing — services formerly provided by wild fires and grazing herds of buffalo.

THE OLD MULLAN TRAIL

It's been decades since the shouts of bullwhackers and the crack of whips have been heard along this almost invisible trail. The freight wagons have long since departed and the sounds heard today are generated by more modern means of transportation and, if you listen closely, by those native residents of the prairie — meadowlarks, horned larks, upland sandpipers, and their brethren.

In the early 1860's, Army Lieutenant John Mullan and a work crew constructed a 642 mile long wagon road linking the western-most navigable waters of the Missouri River at Fort Benton, with the eastern-most navigable waters of the Columbia River, at Walla Walla, Washington. Though no longer visible on the ground, traces of the old road can be seen from the air.

NESTING DUCKS

In an excellent year, over 40,000 waterfowl have been raised on the Refuge making it one of the most productive waterfowl refuges in the country. Twelve species of ducks share in this nesting bonanza including mallard, gadwall, pintail, lesser scaup, shoveler, three species of teal, redhead, ruddy duck, and canvasback.

Nesting on the ground can be hazardous to a duck's health. Recall how nesting islands have been built to separate ground nesting ducks from most predators. Another way of safeguarding nesting hens is to grow dense cover that predators find difficult to move through and locate nests. And so, a special planting has been developed — called dense nesting cover — that ably conceals nesting ducks.

Compare the dense nesting cover north of the road with the shorter native grasslands cover south of the road. If you're a youngster, pretend you're a duck sitting on a ground nest. Which field would you feel safer nesting within?

A PLACE TO GROW

Once ducklings hatch and dry off, the hen will lead them to marsh waters. The refuge has carefully developed just the right habitat for these young flightless ducks; shallow waters rich in food with good stands of cattail and bulrush in which to hide. Watch closely as duck broods can often be seen feeding along the shoreline. At the slightest inkling of danger, some broods will quickly vanish into a maze of cattail and bulrush, while others like gadwall seek safety in open water where they can see any approaching danger.

DUCKS UNLIMITED PROJECT

The structure you just crossed over is not only a bridge but is also a control structure that regulates the flow of water out of Marsh Unit II. The double dike and channel arrangement is the heart of the water delivery system for the lower marshes. Water in these units can be redistributed to where it's most needed by use of a pumping system.

The marsh impoundment on your left was constructed by Ducks Unlimited, Inc. It includes a 330 acre pool, a long dike, three nesting islands and — shades of King Arthur — a predator thwarting moat.

This area is a favorite place to see yellow-bellied marmots who make their home among the rocks and along the dike.

OVER-WATER NESTING

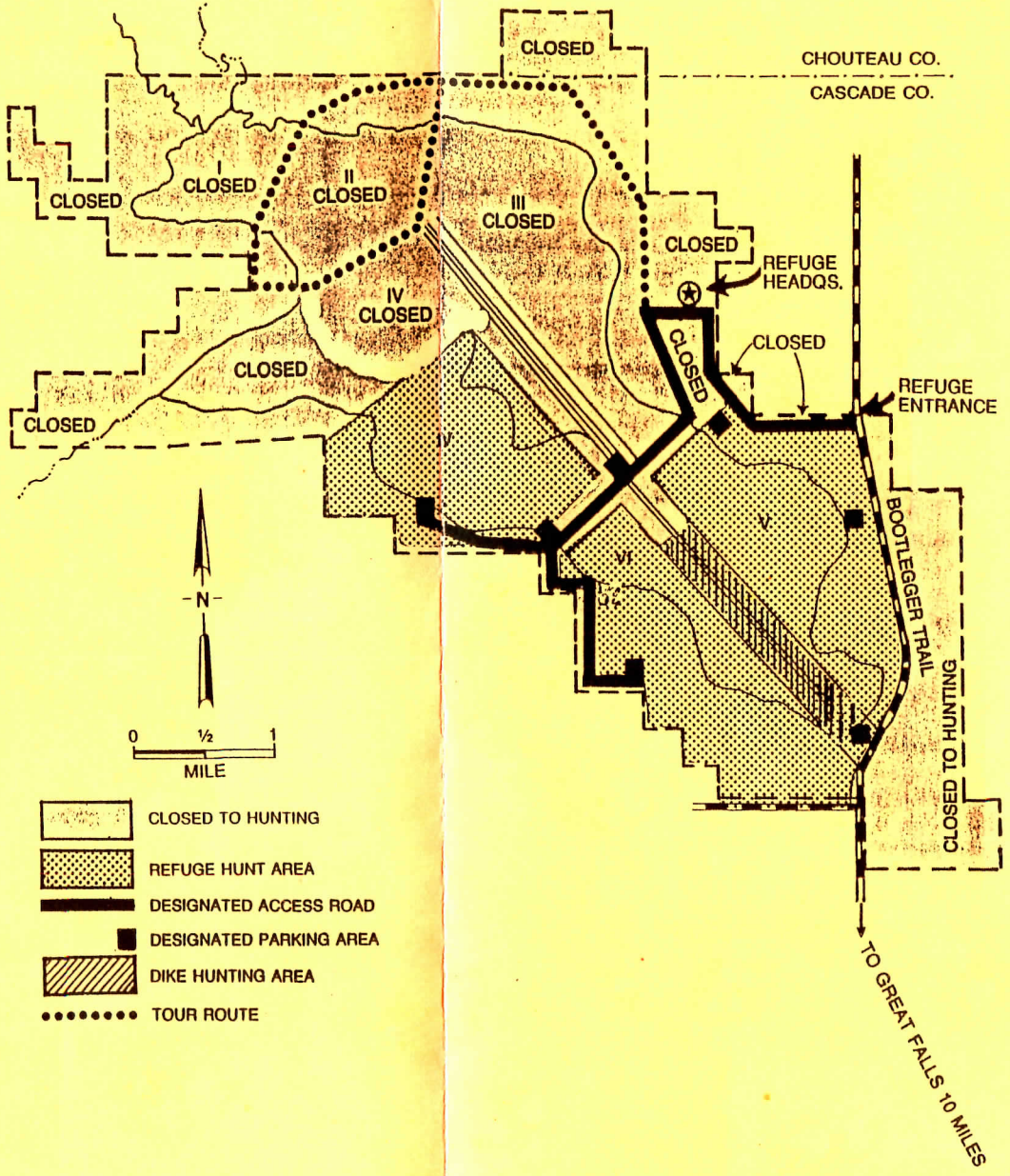
Many species of birds nest in the marshes using a wide variety of nests ranging from floating platforms, a few inches above the water, to tightly woven nest cups secured in the tops of cattails. The large hay bales and upright cement culverts you see in the marshes supplement the muskrat houses or small islands which are favorite nesting sites for Canada geese.

United States
Department of the Interior

BENTON LAKE
NATIONAL WILDLIFE REFUGE

Chouteau and Cascade Counties Montana

Fish and Wildlife Service



Benton Lake

NATIONAL WILDLIFE REFUGE

Hunting Information

REFUGE SIGNS–KNOW THEIR MEANING

Closed Area—No public entry

Refuge Boundary—authorized entry only

Public Hunting Area—area behind this sign open to hunting

Steel Shot Zone— non-toxic shot must be used for all hunting

Waterfowl Production Area—areas purchased with Duck Stamp funds, open to hunting

REGULATIONS

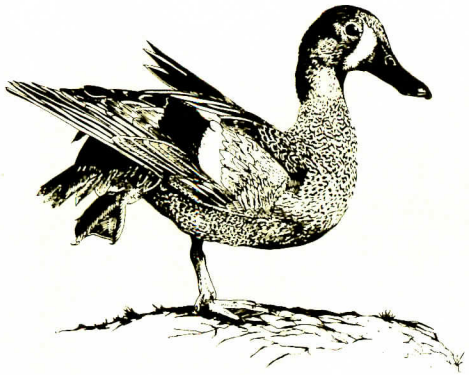
WHERE YOU CAN HUNT	SPECIES	SEASONS/HOURS
Areas bounded by **"Public Hunting Area"** signs. Includes Marsh Units IVc, V, & VI. (See the map on the other side).	Ducks, geese, coots mergansers, tundra swans, partridge, pheasants, grouse	Hunting is permitted beginning with opening of waterfowl season and closes November 30. State seasons and hours apply within this time period.

SPECIAL REFUGE CONDITIONS

* State and Federal hunting regulations apply.
* Non-toxic shot is required for both waterfowl and upland bird hunting. **Possession of lead shot while in the field is prohibited.**
* Park in designated parking areas. Do not block gates.
* No hunting on or within 25 yards of dikes or roads except the marked portion of the dike between Marsh Units V & VI. However, you must have a means of bird retrieval, either a boat or a trained dog, while hunting on this dike.
* Access to the refuge from or across private land is prohibited.
* Temporary portable blinds or blinds made of natural vegetation may be used.
* Non-motorized boats are permitted and encouraged.
* Downed game may not be retrieved from areas closed to hunting.

GENERAL INFORMATION

* **CAUTION!** Water and muck near dikes may be very deep!
* Only those species listed above may be hunted. All other wildlife is protected including deer, antelope, coyotes, gulls, etc.
* Handicapped hunters may be granted special access priviledges. Check at the refuge office or with a refuge officer.
* Chances are you will checked by a state or federal conservation officer. Know and heed all state and refuge regulations.



WELCOME to Benton Lake National Wildlife Refuge. The refuge is one of over 450 refuges nationwide that provide critical habitat for migratory birds and other wildlife. Set aside in 1929, this area covers 12,383 acres of prairie and wetland, and offers you the chance to experience this important natural heritage.

This leaflet was prepared to make your trip to the refuge more enjoyable, while ensuring your safety and the continued well-being of the area's wild plants and animals. Recreation on the refuge is limited to wildlife-oriented uses such as wildlife viewing, education and photography. In the fall, about a third of the refuge is open to sport hunting. There are no fishing opportunities.

Please note the general regulations for public use which are fairly standard on refuges across the country. It is also a good idea to call ahead during or just after inclement weather to make sure roads and trails are open. Frequently, gates must be closed on a moment's notice due to mud, snow or high water.

For more information on the refuge, consult the other leaflets available near the entrance or at the office. The general, wildlife drive and bird leaflets all provide good information on the history, management and wildlife viewing opportunities at Benton Lake.

General Information and Regulations

Parking is permitted in designated areas or along roadsides or at trailheads. However, park so as not to block any road, trail or gate to other vehicles.

The Refuge is open during daylight hours only.

Keep your refuge beautiful. No fires, littering, camping or overnight parking.

All plants and wildlife are protected. Pets must be kept under close control at all times to protect nesting birds and other wildlife.

Public restrooms are available on the back side of refuge office.

Rattlesnakes have been seen along and east of Bootlegger Trail.

Questions? Remember that activities not specifically listed in this leaflet are prohibited without special permission. If in doubt, contact the refuge office for further information. Call (406) 727-7400, weekdays from 8 a.m.-4:30 p.m. or write Refuge Manager, Benton Lake NWR, P.O. Box 450, Black Eagle, MT 59414.

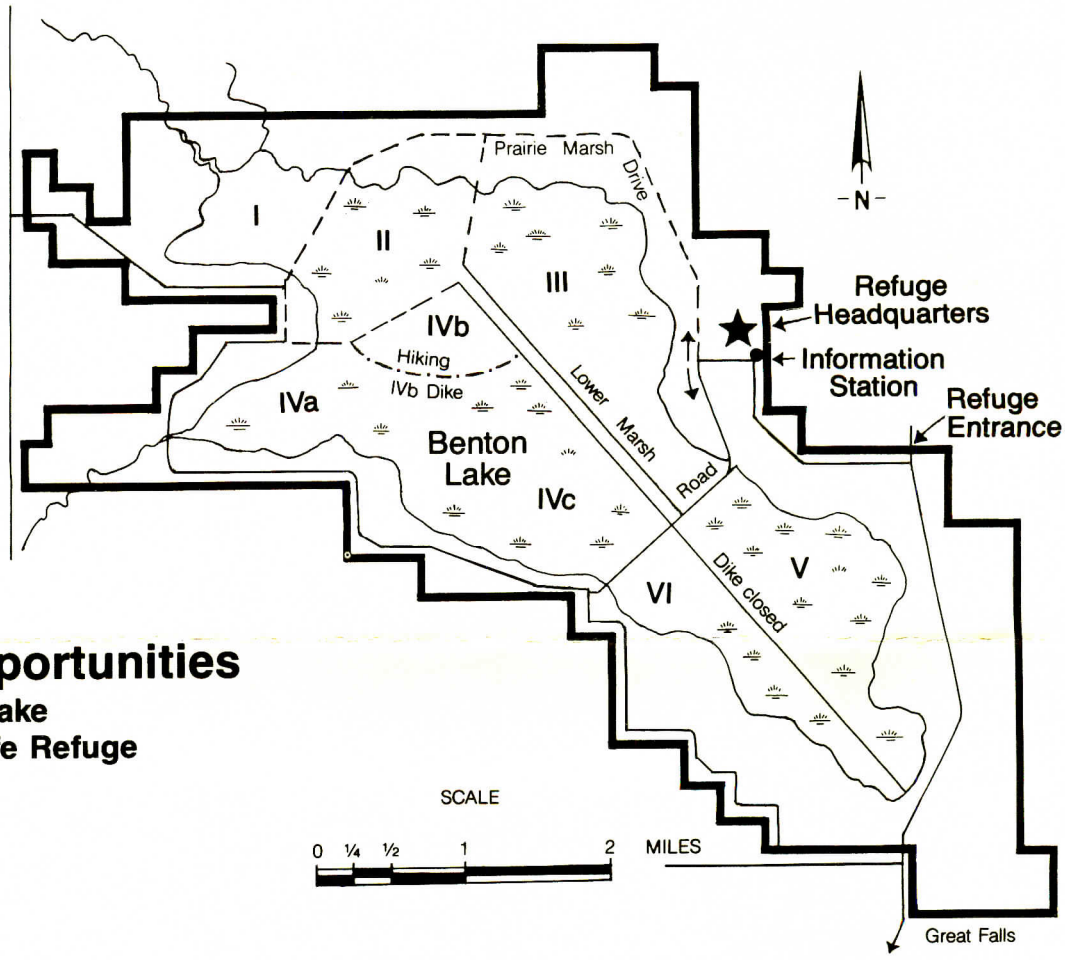
U.S. GOVERNMENT PRINTING OFFICE: 1990—832-881

PUBLIC USE

Opportunities and Regulations

Benton Lake National Wildlife Refuge

Black Eagle, Montana



Public Use Opportunities

Benton Lake National Wildlife Refuge

ACTIVITY	AREA OPEN	DATES OPEN	COMMENTS
HIKING	All uplands & IVb dike	Year around except IVb dike which is open July 15-Sept. 30	Access limited during winter. Roads not plowed past headquarters.
AUTO TOURING	Prairie Marsh Drive	Year around	Access limited during winter. Roads not plowed. May be closed without notice due to wet conditions.
	Lower Marsh Road	July 15-Sept. 30	No large RV's/trailers due to road turns. Road rough, clearance limited.
PHOTOGRAPHY	All above	Year around	In marshes by permit only to limit *disturbance* to colonial nesting birds.
ENVIRONMENTAL EDUCATION	Various areas based on group needs	Year around	
CANOEING	Unit I and II	July 15-Sept. 30	Special Use Permit only, available at office.
CROSS-COUNTRY SKIING	Entire refuge	Winter	Access limited. Roads not plowed.
PHOTO, OBSERVATION BLINDS	Selected areas	Year around	Special Use Permit only. Blind to see dancing sharp-tailed grouse available by reservation April-May.

	Sp	S	F	W
KINGFISHERS				
___ Belted Kingfisher	r	r	r	
WOODPECKERS				
___ Downy Woodpecker	r			
___ Northern Flicker	o		o	
FLYCATCHERS				
___• Say's Phoebe	u	u	u	
___• Western Kingbird	o	u	r	
___• Eastern Kingbird	o	u	r	
LARKS				
___• Horned Lark	a	a	a	a
SWALLOWS				
___ Tree Swallow	o	r		
___ Violet-green Swallow	r	r		
___ Northern Rough-winged Swallow	r	r	r	
___ Bank Swallow	o			
___• Cliff Swallow	u	u	r	
___• Barn Swallow	c	a	u	
MAGPIES AND CROWS				
___• Black-billed Magpie	u	u	o	r
___• American Crow	u	u	o	
CHICKADEES				
___ Black-capped Chickadee	r			r
___ Mountain Chickadee	r			r
NUTHATCHES				
___ Red-breasted Nuthatch	r	o	r	
WRENS				
___• Rock Wren	o	o		
___• House Wren	o	o	r	
___• Marsh Wren	u	c	o	r
THRUSHES				
___ Golden-crowned Kinglet	r		r	
___ Ruby-crowned Kinglet			r	
___ Mountain Bluebird	u		o	
___ Townsend's Solitaire	o		o	r
___ Veery	r			
___• American Robin	u	u	o	r
___ Varied Thrush	r		r	
MIMIC THRUSHES				
___ Gray Catbird		r		
___ Northern Mockingbird	r	r		
___ Brown Thrasher	r	r		
PIPITS				
___ American Pipit	u		c	
___ Sprague's Pipit		r	r	

	Sp	S	F	W
WAXWINGS				
___ Bohemian Waxwing	o		o	u
___ Cedar Waxwing		r		
SHRIKES				
___ Northern Shrike	r		o	o
___ Loggerhead Shrike	o	r	r	
STARLINGS				
___ European Starling	u	u	u	r
WARBLERS				
___ Orange-crowned Warbler	r		r	
___ Yellow Warbler	o	o	r	
___ Yellow-rumped Warbler	u	r	o	
___ American Redstart	r			
___ MacGillivray's Warbler			r	
___• Common Yellowthroat	o	u	o	
___ Wilson's Warbler		r	r	
TANAGERS				
___ Western Tanager	r			
SPARROWS				
___ Rufous-sided Towhee	r			
___ American Tree Sparrow	o		o	o
___ Chipping Sparrow	u	o		
___• Clay-colored Sparrow	o	r		
___ Brewer's Sparrow			r	
___ Vesper Sparrow	c	c	u	
___ Lark Sparrow	o	o		
___• Lark Bunting	o	o		
___• Savannah Sparrow	c	c	u	
___• Baird's Sparrow	u	u		
___• Grasshopper Sparrow	u	u	o	
___ Song Sparrow	u	o	r	
___ White-crowned Sparrow	u	r	o	
___ Harris' Sparrow			r	
___ Dark-eyed Junco	o	r	o	
___• McCown's Longspur	u	u	r	
___ Lapland Longspur	o		o	o
___• Chestnut-collared Longspur	a	a	o	
___ Snow Bunting	o		o	c
BLACKBIRDS AND ORIOLES				
___ Bobolink	o	r		
___• Red-winged Blackbird	c	c	c	
___• Western Meadowlark	a	a	a	
___• Yellow-headed Blackbird	a	a	a	r
___ Rusty Blackbird			r	
___• Brewer's Blackbird	u	u	o	
___ Common Grackle	r			
___• Brown-headed Cowbird	u	u	u	
___ Northern Oriole			o	

	Sp	S	F	W
FINCHES				
___ Rosy Finch			r	r
___ Red Crossbill		r		
___ Common Redpoll	o		o	u
___ House Finch	o		o	
___ Pine Siskin			r	
___ American Goldfinch	o	r	o	u
WEAVER FINCHES				
___• House Sparrow	o	o	o	

ACCIDENTALS

Mute Swan	Curlew Sandpiper
Black Scoter	Parasitic Jaeger
Surf Scoter	Long-tailed Jaeger
Garganey	White-winged Dove
Green-backed Heron	American Dipper
Great Egret	Cattle Egret

Your bird and other wildlife sightings are an important part of monitoring wildlife use on Benton Lake National Wildlife Refuge. Please share your uncommon, occasional or rare bird sightings with the refuge staff.

For more information contact:

Refuge Manager
Benton Lake National Wildlife Refuge
P.O. Box 450
Black Eagle, Montana 59414
(406) 727-7400

DATE _____ TIME _____

OBSERVER(S) _____

WEATHER _____

NOTES

UNITED STATES
DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

RF-61510-2

Printed August 1993

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Birds of

BENTON LAKE

National Wildlife Refuge

Montana

WELCOME to Benton Lake National Wildlife Refuge, one of over 450 of your refuges across the United States. Benton Lake is 12,383 acres of wetland and prairie set aside in 1929 as a refuge and breeding ground for migratory birds.

The refuge is located at the western end of the famed Prairie Pothole Region, an area characterized by millions of wetlands or "potholes" which serve as the nursery for the bulk of the Nation's waterfowl. These wetlands also harbor scores of other bird and wildlife species dependent on wetlands, including many endangered species.

What you'll see at Benton Lake is a glimpse into pre-settlement times, when the prairie sky was alive with ducks, geese, swans and shorebirds each spring and fall, and the marshes teemed with downy young each summer. Enjoy and help protect this natural heritage!

SEASONAL BIRDING HIGHLIGHTS

Spring. Beginning in mid-March large numbers of pintails, mallards and tundra swans appear as ice leaves the lake. From several hundred to several thousand snow geese arrive and stay for a week or more. Waterfowl in breeding plumage have paired off and begin to seek nesting sites. As the weather warms, more and more species arrive, with shorebirds the last to make their appearance. Endangered bald eagles and peregrine falcons are often seen in the spring. Canada geese with young may be seen as early as late April, and some duck broods in late May. Pheasants and sharp-tailed grouse begin courtship antics.

Summer. By June all birds that will nest at Benton Lake have arrived. Broods of ducks become a common sight and the refuge is one of the best places in the country to see them in large numbers. Colonial nesting birds like eared grebes and Franklin's gulls are raising their young and a lot of racket. Songbirds are busy raising their young and if you're lucky, you may see burrowing owls which nest on the refuge in limited numbers.

Fall. Shorebird numbers peak once again during the early fall migrations. Waterfowl begin to "stage" on the marsh in preparation for migration further south. Large concentrations of raptors appear, most notably Swainson's hawks. Bald eagles are most commonly seen at this time, especially mid to late October and early November. Several thousand tundra swans mark the beginning of the end of migration. Refuge grasslands take on their subtle, but beautiful, fall colors.

Winter. Great horned owls often move into shelterbelts in winter. Other hardy raptors seen occasionally include goshawks, rough-legged hawks and snowy owls. Few song birds are present, but include horned larks, longspurs, chickadees and sometimes snow buntings. Shrikes are more common than at other times of the year. Pheasants and gray partridge sightings are more common as they spend more time "exposed" in search of food. Bird and other wildlife tracks left in the snow add interest to a bleak, yet beautiful landscape.

BIRDING TIPS

Your vehicle makes a good blind to observe most marsh and grassland species. Early morning and evening hours are best since wildlife is most active then. Slowly walking along refuge shelterbelts is a good way to see sparrows and other songbirds. Much of the refuge is open to birding, but check the Public Use Regulations designed to protect sensitive areas. You are also encouraged to stop at the office and visit with refuge staff about the latest bird sightings and species concentrations. We are here to help!

REFUGE LIST

This list of 199 bird species represents observations since 1961 when the refuge was first staffed. Many of the records have come from birdwatchers since that time. An additional 12 species of accidental occurrence are noted at the end of the list. Birds marked with a (•) are known to have nested here. Some species present in summer do not nest here, but represent either late or early migrants or non-breeding "strays." The following legend indicates the relative abundance of each species in each season:

Sp—Spring	March through May
S—Summer	June through August
F—Fall	September through November
W—Winter	December through February
a—abundant	Common species, very numerous
c—common	Certain to be seen in suitable habitat
u—uncommon	Present, but not certain to be seen
o—occasional	Seen only a few times during a season
r—rare	Seen at intervals of 2 to 5 years

	Sp	S	F	W
LOONS				
___ Common Loon	o	r	o	
GREBES				
___• Pied-billed Grebe	u	u	u	
___ Horned Grebe	u	r		
___ Red-necked Grebe	r	r	r	
___• Eared Grebe	a	a	c	
___• Western Grebe	u	u	u	
___ Clark's Grebe			r	
PELICANS				
___ American White Pelican	u	u	u	
CORMORANTS				
___• Double-crested Cormorant	o	o	o	
BITTERNS, HERONS AND IBIS				
___• American Bittern	u	u	o	
___ Great Blue Heron	o	o	o	
___ Snowy Egret	r	r		
___• Black-crowned Night-Heron	u	c	o	
___• White-faced Ibis	u	u	u	
SWANS, GEESE AND DUCKS				
___ Tundra Swan	a	r	a	r
___ Trumpeter Swan	r			
___ Greater White-fronted Goose	r		r	
___ Snow Goose	a	r	a	r
___ Ross's Goose	u		u	
___• Canada Goose	c	c	c	c
___ Wood Duck	r	r		
___• Green-winged Teal	c	c	c	
___ American Black Duck				r
___• Mallard	a	c	a	o
___• Northern Pintail	a	c	a	
___• Blue-winged Teal	a	a	a	
___• Cinnamon Teal	c	c	c	
___• Northern Shoveler	a	a	a	r
___• Gadwall	a	a	a	r
___ Eurasian Wigeon	o		r	
___• American Wigeon	c	c	c	r
___• Canvasback	u	u	u	r
___• Redhead	u	u	u	r
___ Ring-necked Duck	u	r	o	
___ Greater Scaup			r	
___• Lesser Scaup	c	c	c	
___ Oldsquaw	r		r	
___ White-winged Scoter		r	r	
___ Common Goldeneye	a	o	o	r
___ Barrow's Goldeneye	o	r	o	r
___ Bufflehead	u	o	u	r
___ Hooded Merganser	r	r	r	
___ Common Merganser	o	r	o	
___ Red-breasted Merganser	o	r	o	
___• Ruddy Duck	u	u	u	
HAWKS, EAGLES AND FALCONS				
___ Osprey	r	r	r	
___ Bald Eagle	u	r	u	r
___• Northern Harrier	c	c	c	r
___ Sharp-shinned Hawk	r		r	
___ Cooper's Hawk	r		o	r
___ Northern Goshawk			r	
___• Swainson's Hawk	u	c	u	
___ Red-tailed Hawk	o	o	o	
___• Ferruginous Hawk	o	r	r	
___ Rough-legged Hawk	o	r	o	u
___ Golden Eagle	u	o	o	o
___• American Kestrel	o	o	o	
___ Merlin	r	r	r	r
___ Peregrine Falcon	o	r	o	r
___ Gyrfalcon	o		r	o
___ Prairie Falcon	u	u	u	o
GALLINACEOUS BIRDS				
___• Gray Partridge	u	u	u	u
___• Ring-necked Pheasant	u	u	u	u
___• Sharp-tailed Grouse	o	o	o	o
RAILS AND COOTS				
___ Virginia Rail		u		
___• Sora	u	c	u	
___• American Coot	c	a	a	r
CRANES				
___ Sandhill Crane	u	o	o	
SHOREBIRDS				
___ Black-bellied Plover	u	o	o	
___ Lesser Golden-Plover	r	r	r	
___ Semipalmated Plover	o		o	
___ Piping Plover	r			
___• Killdeer	c	c	c	r
___• Black-necked Stilt	u	u	r	
___• American Avocet	c	a	u	
___ Greater Yellowlegs	o	o	r	
___ Lesser Yellowlegs	u	u	r	
___ Solitary Sandpiper	r			
___• Willet	u	u	o	
___• Spotted Sandpiper	o	u	r	
___• Upland Sandpiper	u	u	r	
___ Whimbrel	r			
___• Long-billed Curlew	o	o	r	
___ Hudsonian Godwit	r			
___• Marbled Godwit	u	u	o	
___ Ruddy Turnstone	r	r		
___ Red Knot	r	r		
___ Sanderling	o		o	
___ Semipalmated Sandpiper	o			
___ Western Sandpiper	u	o		
___ Least Sandpiper	u	o		
___ Baird's Sandpiper	u	u	r	
___ Pectoral Sandpiper		r	o	
___ Dunlin	r			
___ Stilt Sandpiper	r			
___ Short-billed Dowitcher	o	r		
___ Long-billed Dowitcher	u	c	u	
___ Common Snipe	o	o	r	
___• Wilson's Phalarope	c	c	u	
___ Red-necked Phalarope	o	r		
GULLS AND TERNS				
___• Franklin's Gull	a	a	u	
___ Bonaparte's Gull	o	o	o	
___• Ring-billed Gull	u	u	u	
___• California Gull	c	c	u	
___ Sabine's Gull	r		r	
___• Common Tern	u	u	r	
___ Forster's Tern		r		
___• Black Tern	u	u	o	
DOVES				
___ Rock Dove	o	o	o	r
___• Mourning Dove	u	c	c	
CUCKOOS				
___ Black-billed Cuckoo		r		
OWLS				
___ Great Horned Owl	u	u	u	o
___ Snowy Owl	u		r	u
___• Burrowing Owl	u	u	o	
___ Long-eared Owl	r	r		
___• Short-eared Owl	c	c	u	o
___ Northern Saw-whet Owl		r		
GOATSUCKERS				
___ Common Nighthawk		o	r	